

# **NAVIGATOR DVB-T/H USER MANUAL**

**(Software version 2.1.x)**



Date: 10/2007

*AUDEMAT-AZTEC ® is a registered trademark of AUDEMAT-AZTEC Company.*

## TABLE OF CONTENT

---

<b>1. INTRODUCTION.....</b>	<b>4</b>
1.1. General information .....	4
1.1.1. About Audemat-Aztec.....	4
1.1.2. About DVB .....	4
1.1.3. About the NAVIGATOR DVB-T/H.....	4
1.2. Before you start .....	5
1.3. License.....	5
<b>2. PRODUCT PRESENTATION .....</b>	<b>6</b>
2.1. List of included accessories.....	6
2.2. Product features .....	6
2.3. Front panel.....	8
<b>3. NAVIGATOR DVB-T/H QUICK START .....</b>	<b>9</b>
3.1. Connection.....	9
3.2. Configuration.....	9
<b>4. VARIOUS PARAMETERS OF THE EMBEDDED WEB SITE .....</b>	<b>10</b>
4.1. Product Id's .....	10
4.2. Date/Time .....	11
4.3. Users.....	12
4.4. Network.....	13
4.5. DVB Configuration .....	14
4.6. Support .....	16
4.7. Download.....	17
<b>5. USING THE NAVIGATOR VIA THE FRONT PANEL .....</b>	<b>18</b>
5.1. Configuration via the front panel.....	18
5.1.1. IP address.....	19
5.1.2. Mask .....	19
5.1.3. Gateway address.....	20
5.1.4. Management.....	20
5.1.5. About .....	20
5.2. Start a campaign or measure via the front panel.....	21
5.2.1. For a campaign.....	22
5.2.2. For a measure .....	25
5.2.3. Measure acquisition screen color codes .....	26

<b>6. JAVA APPLICATION .....</b>	<b>27</b>
6.1. Launching the NAVIGATOR DVB-T/H application .....	27
6.2. Menu Help / About .....	28
6.2.1. The Navigator DVB-T/H options .....	29
6.3. Real time measurement.....	31
6.3.1. Launching a Scan .....	31
6.3.2. RF Levels .....	33
6.3.3. Constellation : .....	34
6.3.4. Guard time: impulse response.....	35
6.3.5. MPEG Data.....	36
6.3.6. MPEG error.....	37
6.3.7. Mpeg-MIP .....	38
6.3.8. DVB-H error (DVB-H option) .....	39
6.3.9. PCR Jitter .....	40
6.3.10. Mpeg Service (MPEG FULL option) .....	41
6.4. Launch a campaign via the application .....	44
6.4.1. Campaign Configuration.....	45
6.4.2. "Resume Campaign" .....	49
6.4.3. "Import Campaign" .....	49
6.4.4. "Delete a Campaign" .....	51
6.5. « Measure » Menu .....	51
Menu « Join Running Measure » .....	51
6.6. Scan Menu.....	52
6.6.1. "Load" .....	52
6.6.2. "Import" .....	53
6.6.3. "Export" .....	53
6.7. Menu Antenna .....	53
6.7.1. Modify antenna configuration .....	53
6.7.2. Configure a new antenna .....	54
6.8. GPS Menu .....	55
6.9. EXPERT Module (OPTION) .....	56
6.9.1. "General" Tab .....	56
6.9.2. "SI/PSI" TAB .....	58
6.9.3. "DVB-H Burst" tab.....	60
<b>7. FOR FURTHER INFORMATION .....</b>	<b>63</b>
<b>8. GLOSSARY .....</b>	<b>64</b>
<b>ANNEXE A: PARAMETERS RANGE .....</b>	<b>66</b>
<b>ANNEXE B: FUNCTION CHART .....</b>	<b>67</b>

---

## 1. INTRODUCTION

---

### 1.1. General information

#### 1.1.1. About Audemat-Aztec

25 years of experience have enabled Audemat-Aztec to offer a complete range of AM, FM, TV and DVB measuring and monitoring devices.

Its product range consists of embedded dynamic measuring, continuity and broadcast quality monitoring (managing complex sensors, communication, centralization and interactivity), RDS and re-broadcasting.

AUDEMAT-AZTEC only offers products of high technological added value which integrate functional innovation.

Since 2000, Audemat-Aztec's products have received 11 awards at NAB: for the innovation potential of our products.

Our head office is located in Bordeaux Mérignac (France).

Audemat-Aztec has a subsidiary in the United States, based in Miami (Florida).

#### 1.1.2. About DVB

DVB is the name of the European project associating more than 180 structures (industrials, broadcasters and regulating bodies) from more than 20 countries in Europe, which has defined standards in digital Satellite (DVB-S), Cable (DVB-C), DVB-H and terrestrial Hertzian (DVB-T) broadcasting.

It has also defined an encryption system for controlling access. Other DVB standards have also been defined, such as the DVB-TXT (teletext), DVB-ISC (interactive services) and DVB-MHP (interactivity engine).

The DVB-T was approved by ETSI in February 1997. Similar to the DVB-S and the DVB-C, information is encoded, according to MPEG2 and MPEG4 (in some cases) standards, DVB defining the transport mode and error protection systems.

The COFDM modulation has been chosen, in 2K form (1705 carriers) and 8k (6817 carriers). Each of these carriers has been modulated in 16/64 QAM or QPSK (see Glossary for definitions).

#### 1.1.3. About the NAVIGATOR DVB-T/H

NAVIGATOR DVB-T/H completes Audemat-Aztec's metering range: it's a device of metering and recording of broadcasting parameters of one or more DVB channels.

The MPEG analysis part has been done with the partnership of UDCAST who supply a module capable, using the Dektec supplied driver, of counting errors, of informing a memory area shared with these data and of supplying analysis data on an acquisition lasting according to the user's definition.

NAVIGATOR DVB-T/H is delivered with the Full RF Software and Basic MPEG-T Software.

#### Software options:

- Full MPEG Monitoring
- DVB-H option (Expert module)
- Quality-Video option

**Supplementary software:** GoldenEye, DVB reader software.

## 1.2. Before you start

→ The unit is meant to function in diversity mode. Both entries must be connected at all time so as not to risk errors in measurement.

→ Always use **2 identical antennas** connected to the RF1 & RF2 inputs during sessions of diversity mode.

→ The video representation of the “Remote video” mode is **just a control visualization** for the program identification but it is not a guarantee of the reception quality. According to operations in process done by the user or the equipment, it is possible to note fixed pictures or discontinuities of the video flows fluidity.

### **LITHIUM BATTERY**

The Navigator motherboard is equipped with a lithium battery.

***There is danger of explosion if the battery is not correctly replaced.***

Only replace it with a battery of the same type. Please contact us before attempting to use another type of battery.

Do not throw away used batteries; send them back to us.

## 1.3. License

Please refer to section 6.2.1, Menu Help to manage licenses and options.

---

## 2. PRODUCT PRESENTATION

---

### 2.1. List of included accessories

Check that all these accessories are included:

- 1 crossed Ethernet cable (letter B on the cable)
- 1 straight Ethernet cable (letter A on the cable)
- 1 GPS with cable (letter I)
- 2 magnetic antennas (UHF band)
- 2 fixed antennas (UHF band)
- 1 BNC/BNC cable (letter N)
- 1 cigar lighter power supply cable
- 1 external power supply
- 1 stylus (fixed on the rackbag)
- Option : 1 external battery + cable

**Note concerning this option: if the battery is < 11.2 V, the equipment shuts down.**

### 2.2. Product features

**Weight:** approximately 5 kg (11 lbs).

#### RF Inputs

- 75 ohms input impedance on BNC type female connector.
- 3dB max of VSWR.
- VHF (Channel 5 to 12), UHF (Channel 21 to 69).
- 5, 6, 7 and 8 MHz bandwidth.
- 166.667 kHz frequency step.
- $\pm 167$  kHz or  $\pm 125$  kHz frequency offset supported without configuration.
- -95 dBm to -20 dBm input sensitivity (DVB-T mode dependant).

#### DVB-T/H Demodulation

- Fully compliant with the ETS300744 norm.
- Diversity mode.

### ASI Output

- Fully compliant with the EN 50083-9.norm.
- 188/204 bytes per packet in data burst format ("continuous" mode)

### Modulation:

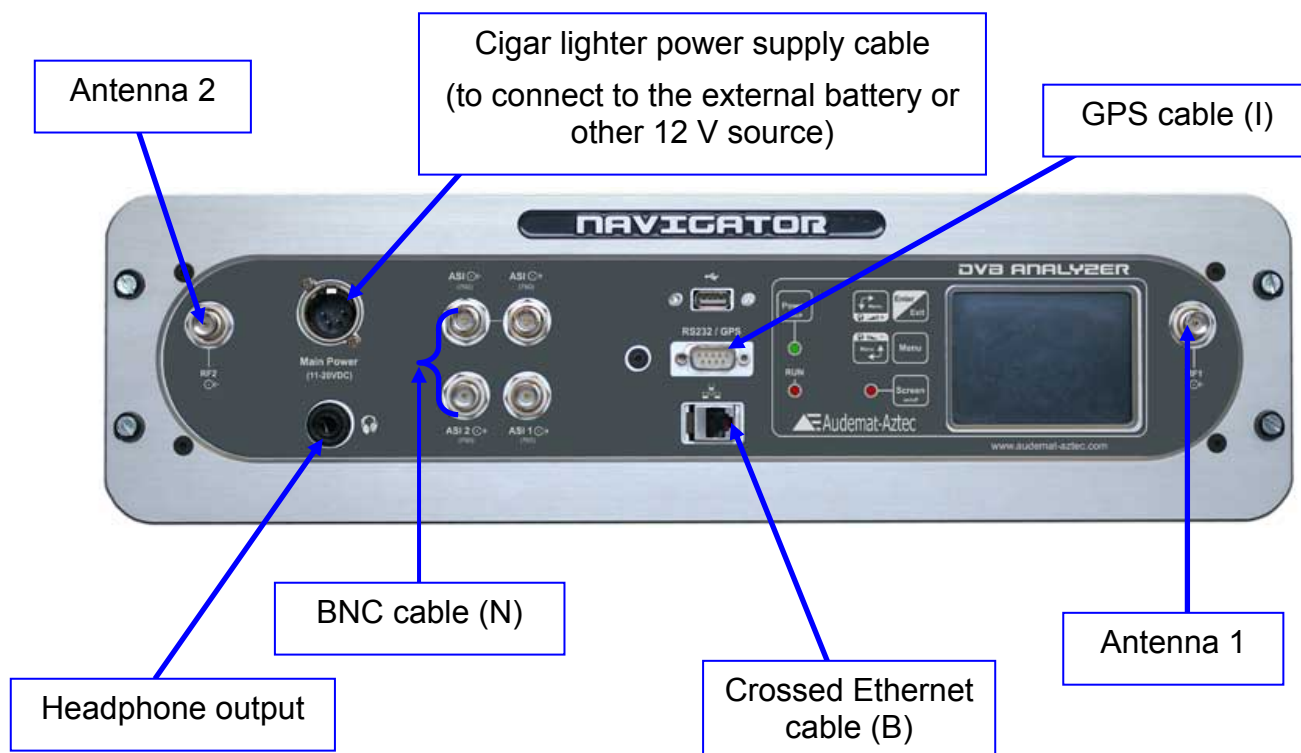
- COFDM
- QPSK, 16QAM, 64QAM
- FFT Modes: 2K, 4K and 8K
- Guard interval: 1/4, 1/8, 1/16, 1/32
- FEC: 1/2, 2/3, 3/4, 5/6, 7/8

### Temperatures

- From 5°C (41°F) to 45°C (113°F) while in use.
- From 0°C (32°F) to 60°C (140°F) in storage.

For all information concerning monitoring parameters: see Appendix A.

## 2.3. Front panel



### Explanation of front panel Leds:

#### LED SCREEN:

- **On** Touchscreen is on
- **Off** Touchscreen is off

#### LED POWER:

- **On** NAVIGATOR DVB-T/H is on
- **Off** NAVIGATOR DVB-T/H is off

### **Note: Advice to switch off the equipment.**

To turn off the equipment, go to "MANAGEMENT" on the touchscreen, then "SHUTDOWN EQUIPMENT" and touch 'Yes'.

Note 2: When using an external battery, make sure to unplug after each usage so as not to discharge the battery too quickly.



### 3. NAVIGATOR DVB-T/H QUICK START

#### 3.1. Connection

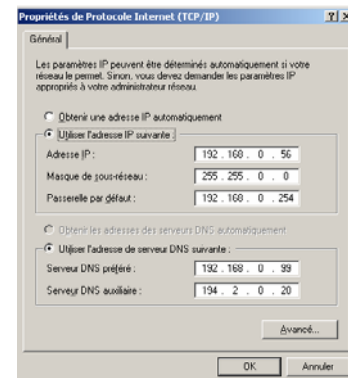
- 1) Connect the equipment using the cigar lighter power supply cable. Then click on the button "POWER on/off" of the front panel.
- 2) Connect the Ethernet cable (crossed\* for a direct connection between the NAVIGATOR DVB-T/H and a computer).
- 3) Set your PC IP address in the 192.168.xx.xx range, so as to avoid IP address conflicts.

For this, go to:

- Configuration panel / Network Connection
- Local network connection / Properties

Click on Internet Protocol (TCP/IP) from the scroll-down menu then on "Properties".

Add the IP address and the sub-net mask. (192.168.0.56 for example / Netmask 255.255.0.0 )



#### 3.2. Configuration

From this point, the configuration can be done using the embedded web site of the NAVIGATOR via the Ethernet network.

Open a Web browser (Internet Explorer, Mozilla...) and enter the address: 192.168.12.32.

By default: login and password are "Admin"/"admin"



## 4. THE EMBEDDED WEB SITE

### 4.1. Product Id's



» Product Id

NAVIGATOR DVB

Product Id's

Date / Time

Users

Network

DVB Configuration

Support

Downloads

» Navigator DVB Identifiers

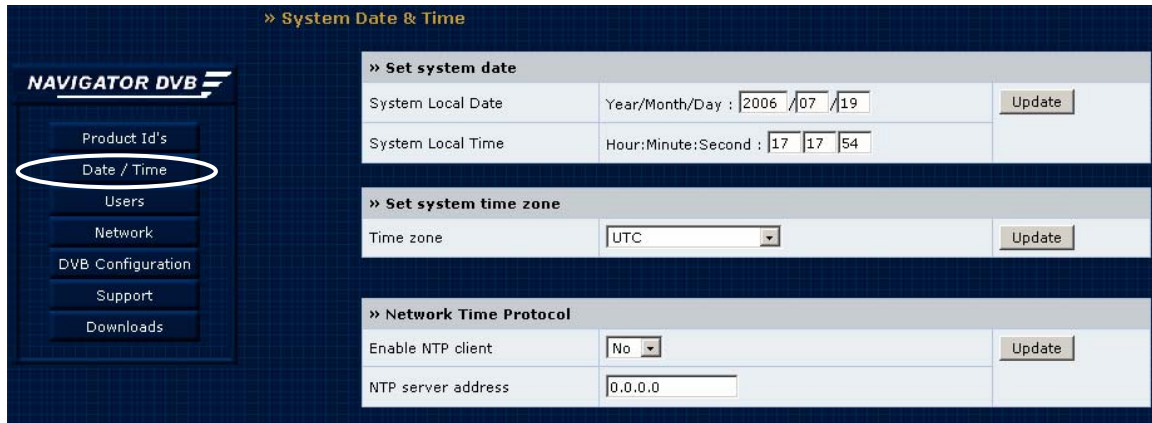
Product name	Navigator DVB	Update
Product description	DVB recording analysis system	
Serial number	00100	
Software version	2.1.0	
Hardware version	2.0	

- Set:
  - • Product name
  - • Product description (optional)
- Check:
  - NAVIGATOR DVB-T/H's serial number
  - Software version
  - Hardware version

**Note:** each time the user enters new parameters, he/she must click on “Update” to save the changes.

**This applies to all Navigators’ DVB-T/H parameters.**

## 4.2. Date/Time



- **Set system date :**

The user may update both date (year/month/day) and time (hour/minute/second)

- **Set system time zone:** to update the geographical time zone

The user selects the geographical zone from the list. Important to have this set correctly when using an NTP server.


- **Network Time Protocol:** NTP update (Network Time Protocol)

The user can enter a time server address to update the equipment's internal clock automatically.

**Note:** we advise restarting the equipment after time or date update.

### 4.3. Users

» Users



- Product Id's
- Date / Time
- Users**
- Network
- DVB Configuration
- Support
- Downloads

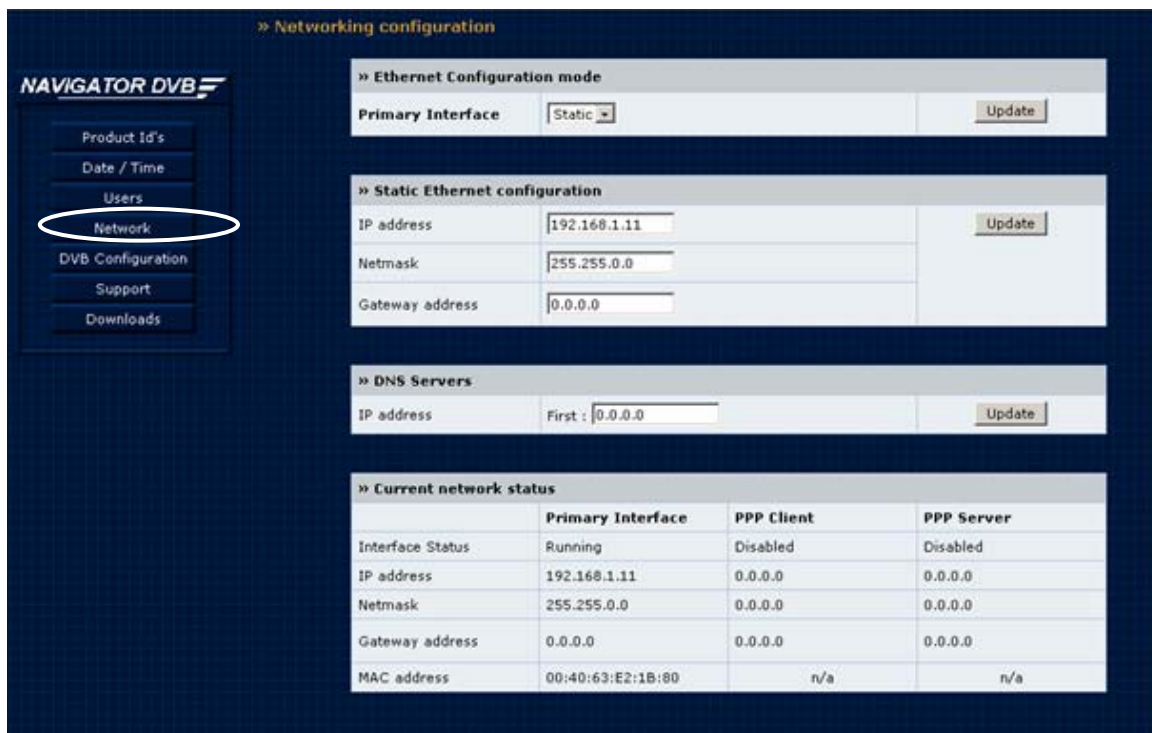
» Web accounts			
<b>Administrator</b>	Login	<input type="text" value="Admin"/>	<input type="button" value="Update"/>
	Password	<input type="text" value="admin"/>	

» FTP accounts			
<b>Webmaster</b>	Login	<input type="text" value="web"/>	
	Password	<input type="text" value="html"/>	
<b>Administrator</b>	Login	<input type="text" value="Admin"/>	
	Password	<input type="text" value="admin"/>	
<b>Update manager</b>	Login	<input type="text" value="update"/>	
	Password	<input type="text" value="maj"/>	

- **Web account configuration:**
  - Administrator: for changing any of the NAVIGATOR DVB-T/H parameters.
- **FTP account configuration:**
  - “**Webmaster**” accounts: access to HTML pages. In this way the user can personalize the embedded web pages (for example, by inserting company logo). Connection must be made to “Webmaster”.
  - “**Administrator**” account: access to entire NAVIGATOR DVB-T/H directory.
  - “**Update Manager**” account: access NAVIGATOR DVB-T/H update directory.

## 4.4. Network



	Primary Interface	PPP Client	PPP Server
Interface Status	Running	Disabled	Disabled
IP address	192.168.1.11	0.0.0.0	0.0.0.0
Netmask	255.255.0.0	0.0.0.0	0.0.0.0
Gateway address	0.0.0.0	0.0.0.0	0.0.0.0
MAC address	00:40:63:E2:1B:80	n/a	n/a

- **IP configuration definition:**

- **Ethernet configuration mode**

The application can be configured in static or dynamic IP.

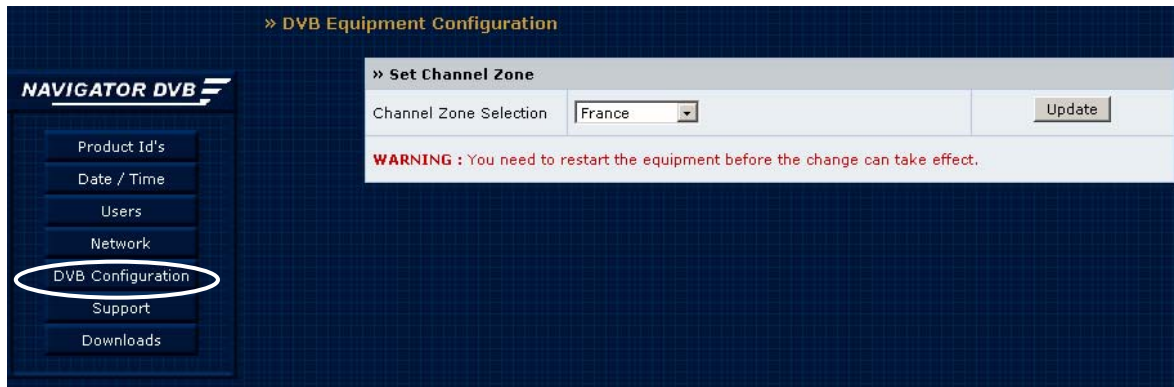
- **Static Ethernet configuration**

If the IP address is a static address, enter the parameters in this window.

- **DNS Servers:** DNS configuration.

- **Current network status:** network's current table.

## 4.5. DVB Configuration



- Set Channel mode:

- RF: allows selection of the file holding configuration parameters linking channel and frequency.

- 0: Western Europe
- 1: Eastern Europe
- 2: France
- 3: Australia 1
- 4: Australia 2
- 5: North America

**Note:** this list might change depending on the version.

The frequency calculation by the selected channel is done with:

Starting frequency + (selected channel – starting channel) \* bandwidth + (bandwidth/2)

Conversion files including:

Starting channel; ending channel; starting frequency; bandwidth

**Western Europe**

05;12;174000;7000

21;69;470000;8000

**Eastern Europe**

06;12;174000;8000

21;69;470000;8000

**France**

05;10;174750;8000

1;69;470000;8000

**North America**

14;83;470000;6000

**Australia1**

10;11;208000;7000

12;12;223000;7000

28;69;526000;7000

**Australia2**

6;9;174000;7000

10;12;209000;7000

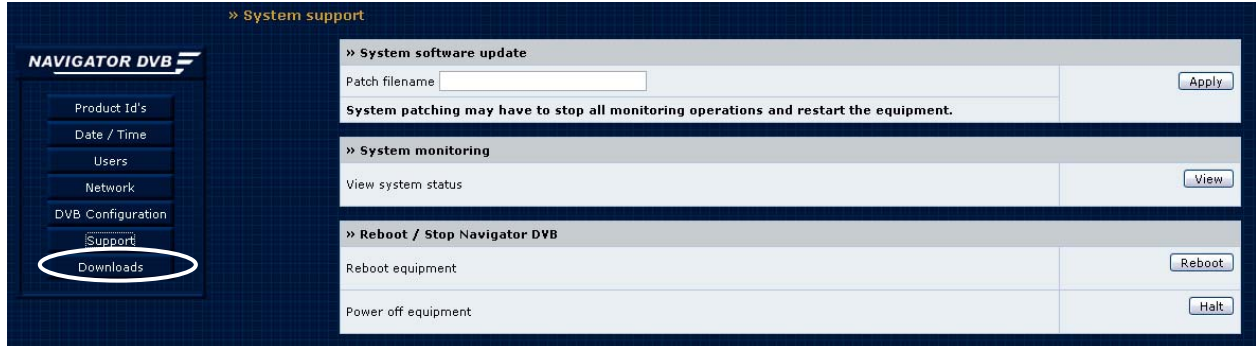
28;69;526000;7000

**Note: it is possible to create a custom configuration file and add it via FTP.**

The file name must be: freqrangexxx, where xxx is a number whose value is the last freqrangex file's number + 1. This file must be then placed in the directory: /var/gt/etc. Access this directory via an FTP connection (with an FTP client such as Filezilla for instance) using the administrator account as described in section 4.3. The root directory is 'var'. Open 'gt/etc' and copy the newly created file there.



## 4.6. Support



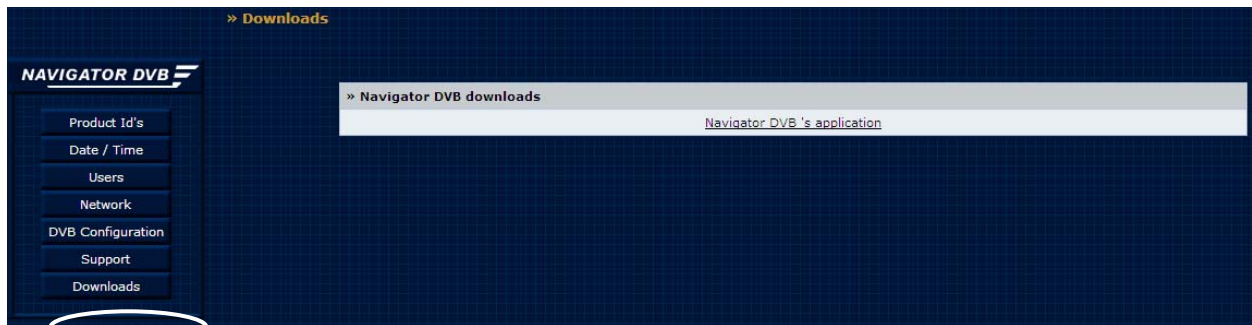
- **Configuration of support system:**

- **System software update:** NAVIGATOR DVB-T/H update with the latest software version. The user must put patch file name in the window: update is automatic when clicking on “Apply”. A more detailed notice is provided with the patches by the technical support.
- **System monitoring:** by clicking on “View” the user can check the system status (temperature, date, ram disk).
- **Reboot / Stop NAVIGATOR DVB:**
  - “Reboot equipment”: total reboot of the equipment.
  - “Power off”: turns off the equipment remotely.

**NOTE:** the equipment cannot be switched on again remotely.



## 4.7. Download



This page enables you to download:

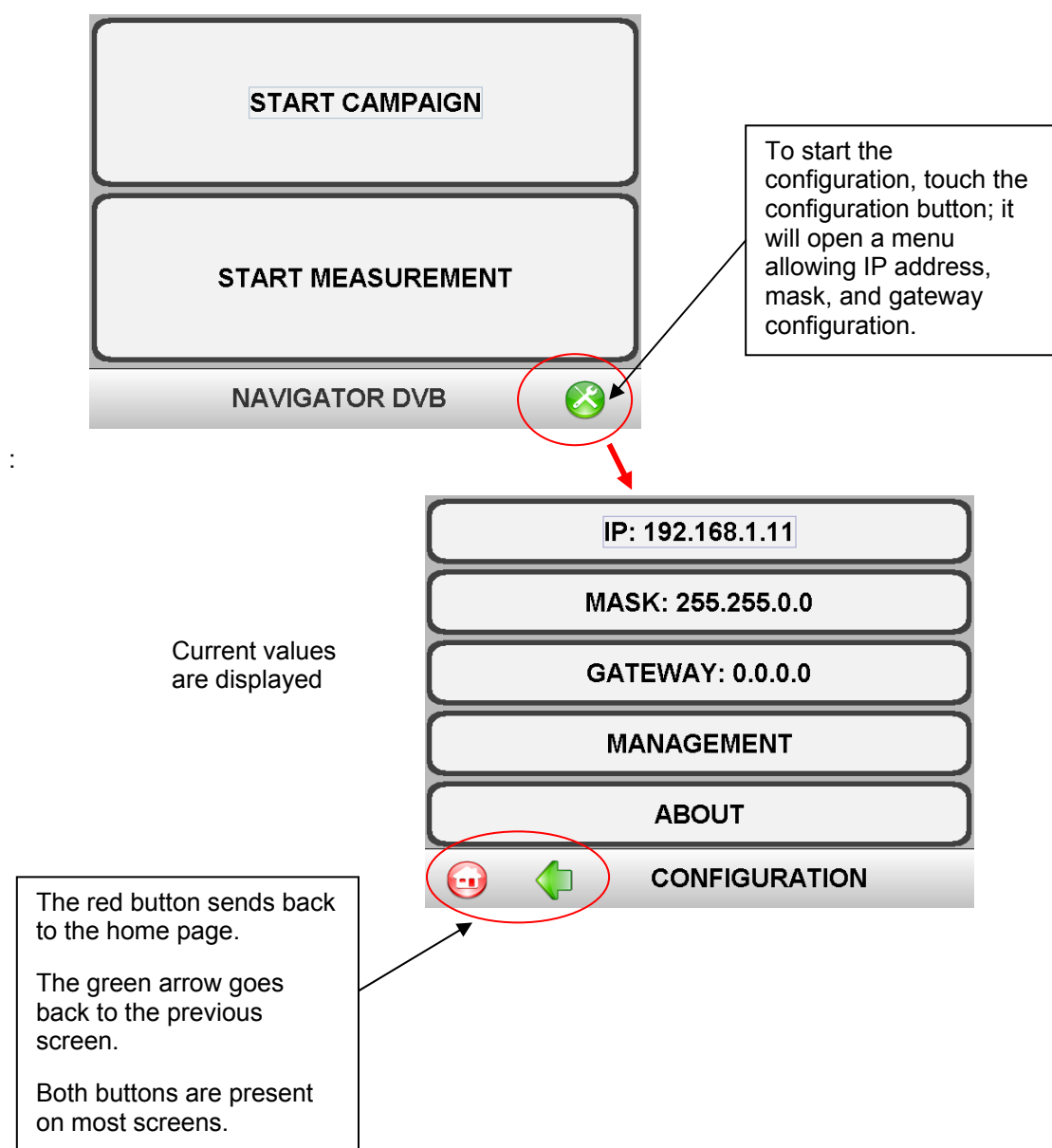
- The Java application for NAVIGATOR DVB-T/H

Click on the line to, and select 'Open' to install the application, or 'Save' to save the installer for later installation.

## 5. USING THE NAVIGATOR VIA THE FRONT PANEL

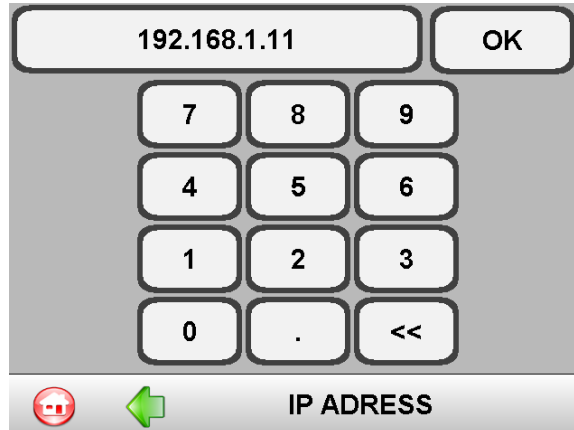
### 5.1. Configuration via the front panel

The home page is as follow:



### 5.1.1. IP address

Simply touch the IP menu to display the following screen. The back space arrow (<<) erases existing data. Enter the new value via the touchpad.

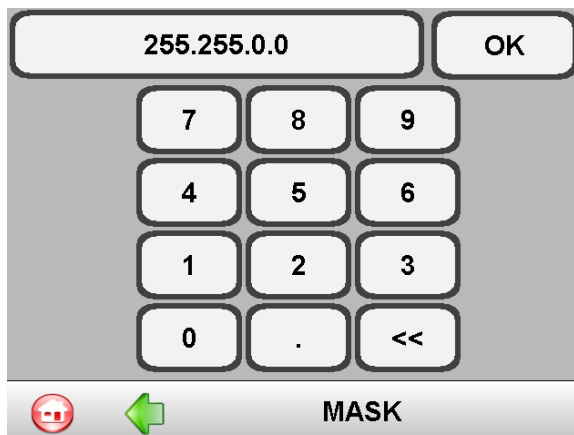


The screen displays a numeric keypad for entering an IP address. At the top, a text field contains "192.168.1.11" and an "OK" button is to its right. The keypad consists of buttons for digits 0-9, a decimal point, and a backspace arrow (<<). At the bottom, there is a navigation bar with a home icon, a back arrow, and the label "IP ADDRESS".

When a valid IP address is entered, the "OK" button on the top right lights up. Touch it to save and activate the new values.

### 5.1.2. Mask

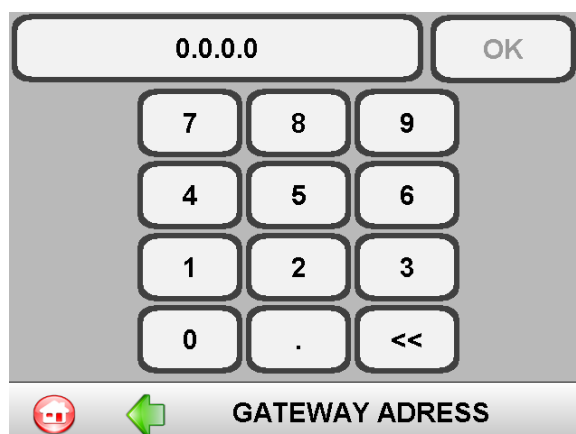
Proceed as described above to modify the mask.



The screen displays a numeric keypad for entering a subnet mask. At the top, a text field contains "255.255.0.0" and an "OK" button is to its right. The keypad consists of buttons for digits 0-9, a decimal point, and a backspace arrow (<<). At the bottom, there is a navigation bar with a home icon, a back arrow, and the label "MASK".

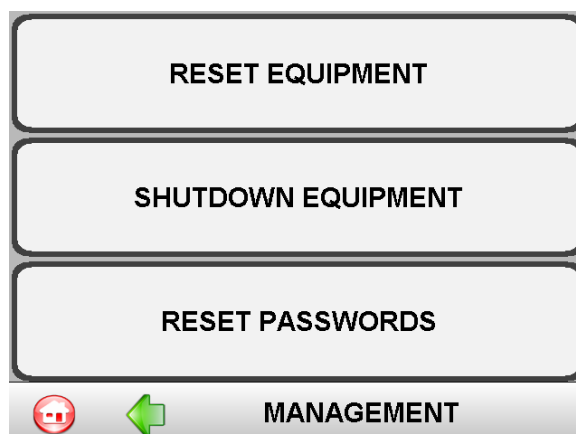
### 5.1.3. Gateway address

Proceed as described above to modify the gateway.



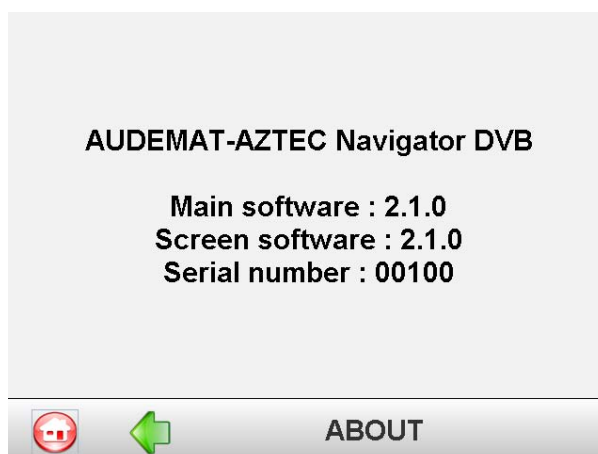
### 5.1.4. Management

Touch “MANAGEMENT” to display the screen that will allow resetting the equipment to its factory configuration, shut it down or reset the password to its default values:



### 5.1.5. About

The “ABOUT” menu displays information about the Navigator DVB-T/H version:



## 5.2. Start a campaign or measure via the front panel

Select one or the other from the main screen:



- “START CAMPAIGN”: to record campaign data.
- “START MEASURE”: to view data only.

It is possible to flag the recording. The flagged information can be reviewed and analyzed after import. It is also possible to view the video in real time:

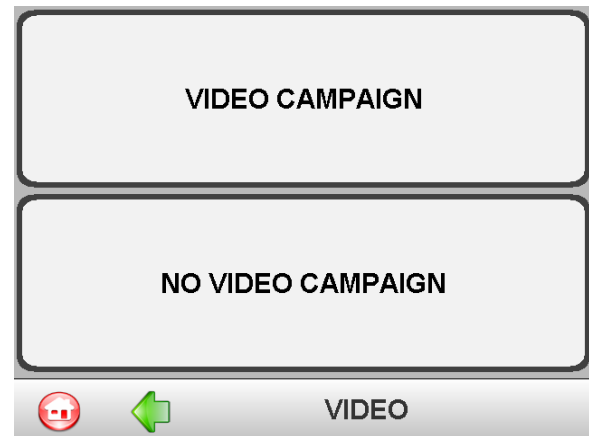
	Flag	Streaming
Video campaign (mono multiplex only)	X	X
Campaign without video mono multiplex	X	X
Campaign without video multiple multiplex	X	
Real-time measures (mono multiplex only)		X

### 5.2.1. For a campaign

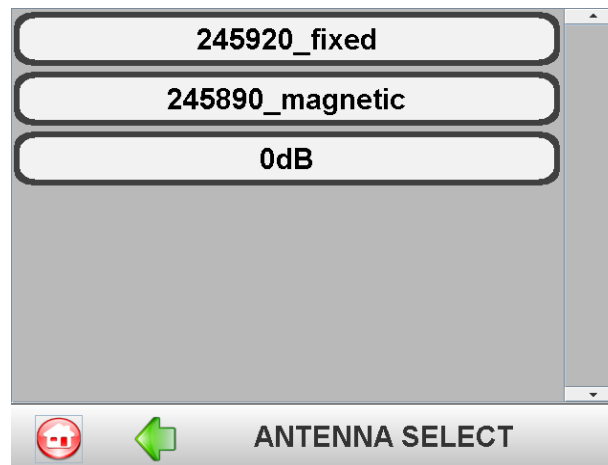
Choose whether to record video or not.

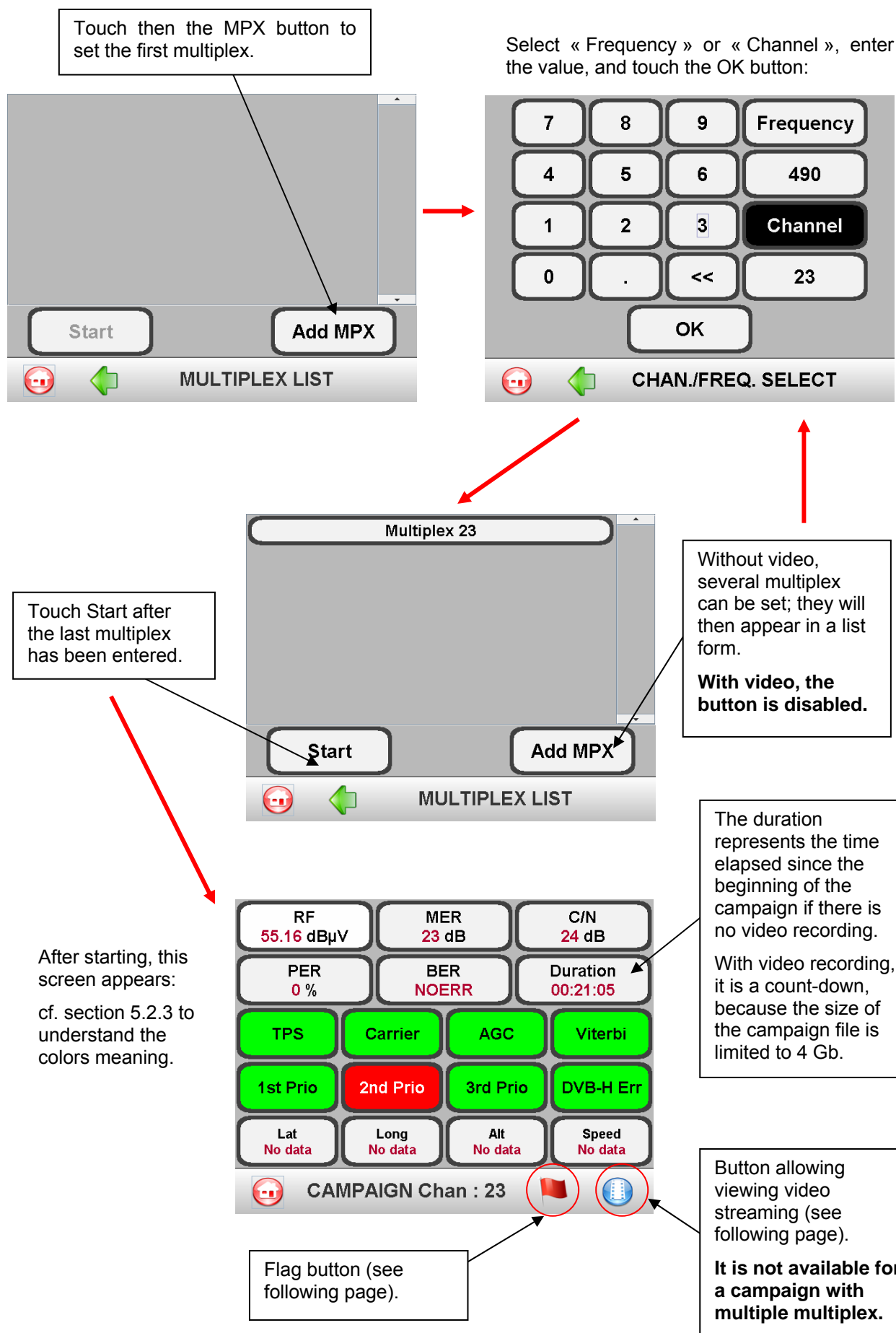
- ➔ With the video, only one multiplex can be selected.
- ➔ Without video, several multiplex can be selected.

**Note: If choosing « No video campaign » and only one multiplex, there will be no video recording, but streaming is available.**



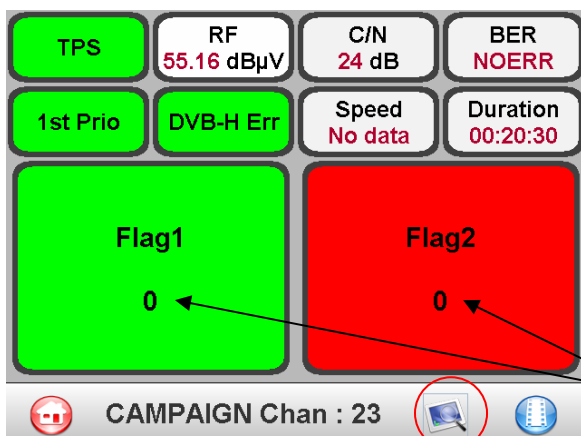
The antenna selection screen appears next. Both antennas are configured by default. Select one for the campaign:





- To flag a recording:

Touch the flag button from the measure acquisition screen to access to the following:



This functionality is particularly interesting when streaming can be done at the same time on a secondary equipment.


In case of problem, touch “Flag1” or “Flag2” so as to note a specific moment in the recording. For instance, each flag could correspond to a given type of error. When data is imported, each previously flagged measure will be identifiable.

The number indicates the number of occurrence for each flag.

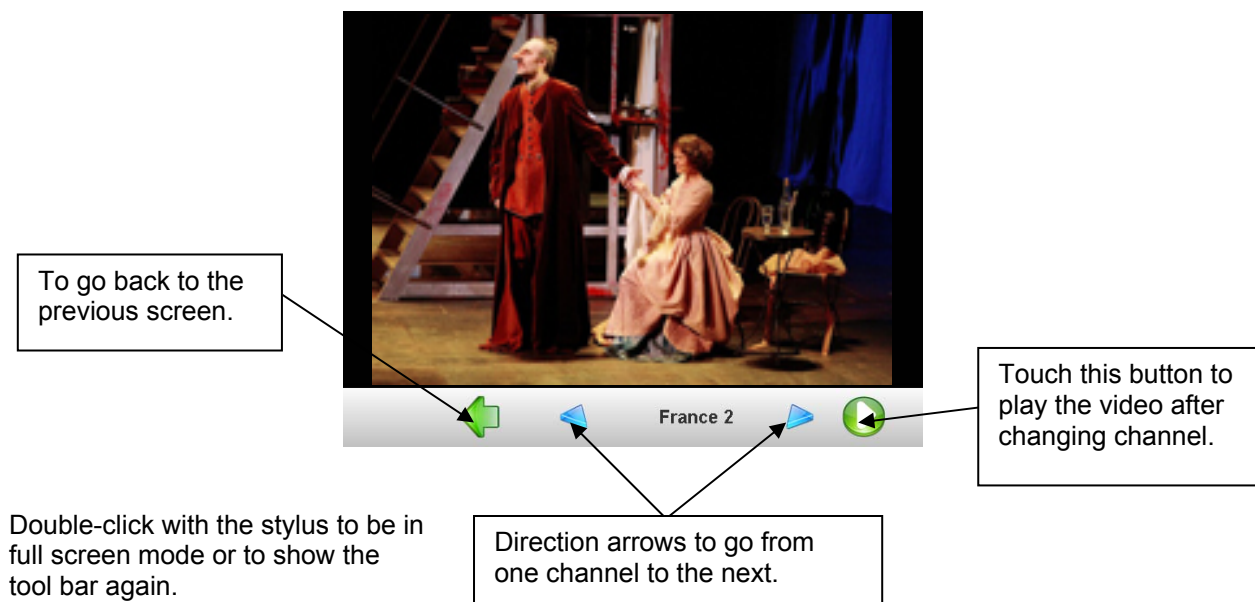
To go back to the main measure screen.

**Note:** With a multiple multiplex campaign, acquisition screens are refreshed frequently so as display data from every multiplex.

- Video streaming:

Touch the button  from any screen for real-time viewing.

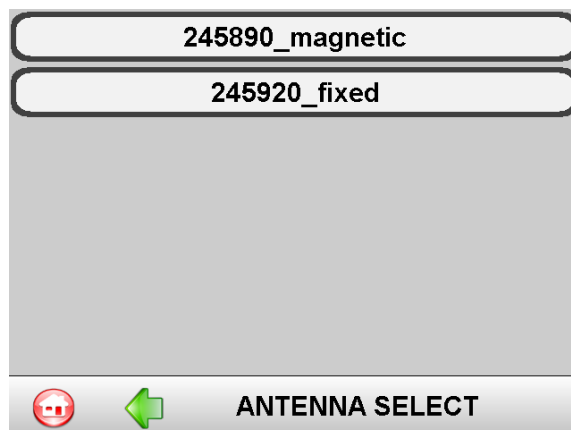
This button is not available for campaigns with several multiplex.





### 5.2.2. For a measure

- After selecting “START MEASURE”, select the antenna you want to use:



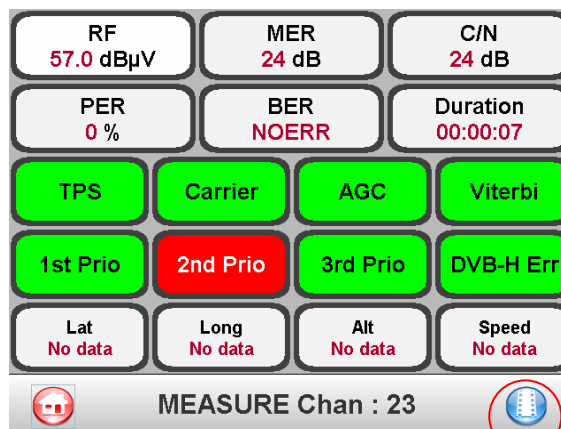
- Then, Channel / Frequency:



As for a campaign, select “Frequency” or “Channel”, enter the value, and touch the “OK” button.

The measure acquisition screen is displayed.

cf. section 5.2.3 to understand the colors meaning



Video streaming is available as with a campaign (cf. previous page).

### 5.2.3. Measure acquisition screen color codes

Depending upon results and the type of measure, colors may vary and they mean different things:

	Green	Orange	Red
<b>TPS</b>	Locked		Unlocked
<b>Carrier</b>	Locked		Unlocked
<b>AGC</b>	Non-active (stable)	Active	
<b>Viterbi</b>	Non-active (stable)	Active	
<b>1<sup>st</sup> Prio</b>	No error		Error
<b>2<sup>nd</sup> Prio</b>	No error		Error
<b>3<sup>rd</sup> Prio</b>	No error		Error
<b>DVB-H Err</b>	No error		Error

## 6. JAVA APPLICATION

### 6.1. Launching the NAVIGATOR DVB-T/H application

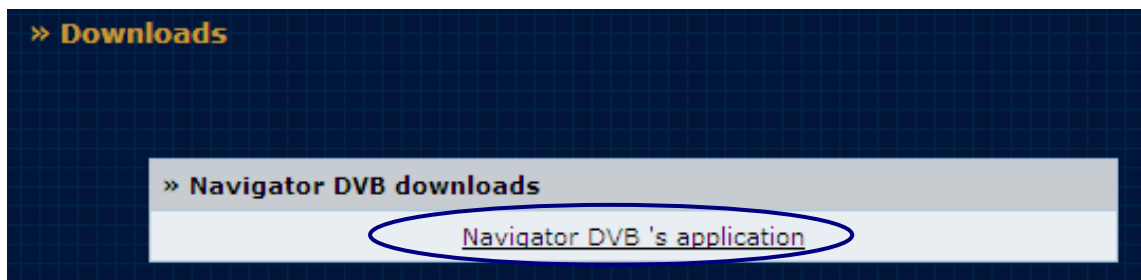
A Java application called “NAVIGATOR DVB-T/H” is included in the unit and is available for downloading on the embedded web site in the “Download” tab.

This easy-to-use application offers many more screens and curves than the front screen application. Both can be used at the same time in most cases. However, four java application actions disable the front screen momentarily:

- scanning,
- file transfer,
- file conversion,
- in Expert mode, capturing.

To use this application, you must previously have established TCP/IP communication with the NAVIGATOR-T/H.

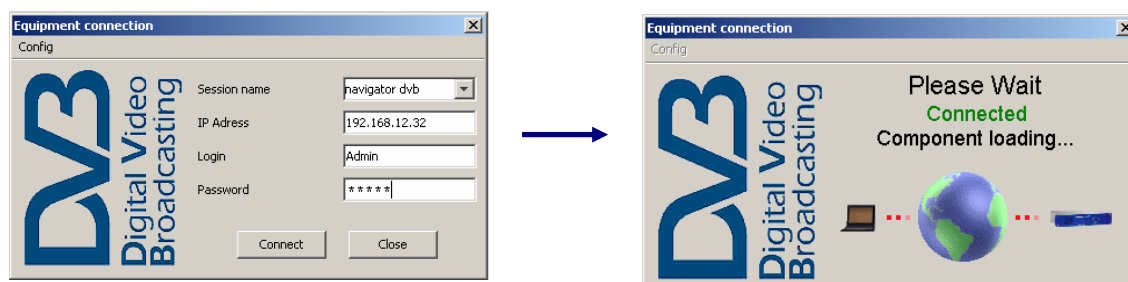
Once the application has been downloaded (in the “Download” tab of the embedded website), click on “NAVIGATOR DVB APPLICATION” to access the application and start it up.



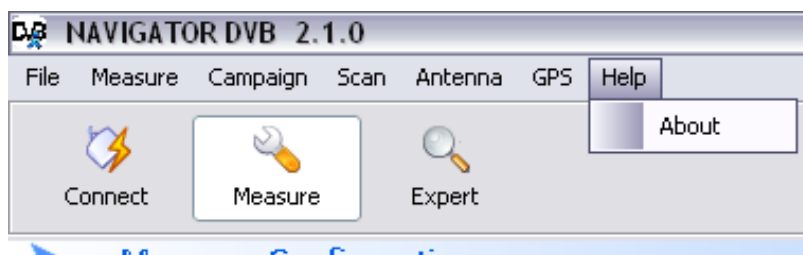
Enter a name for the session in “Session name”, so that the user will recognized it later

Enter the IP address as well as chosen login and password (“Admin”/ “admin” by default).

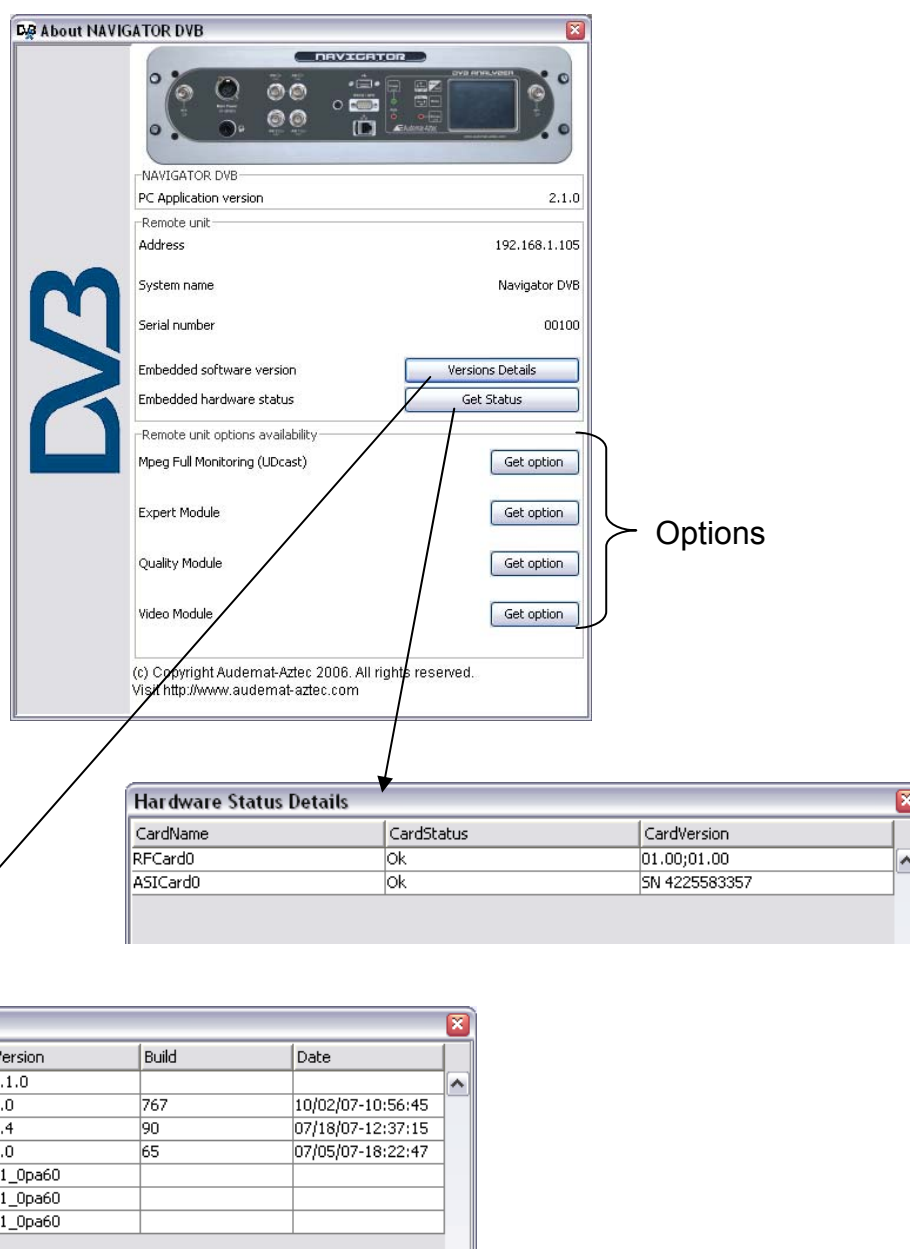
These three parameters are defined in the embedded web site’s network tab.



## 6.2. Menu Help / About



This menu allows the user to check the software and hardware versions, serial numbers and the options took with the equipment.



### 6.2.1. The Navigator DVB-T/H options

Three options are available with the Navigator DVB T/H version 2.1:

- MPEG Full Monitoring
- DVB-H option (Expert module)
- Quality – Video option

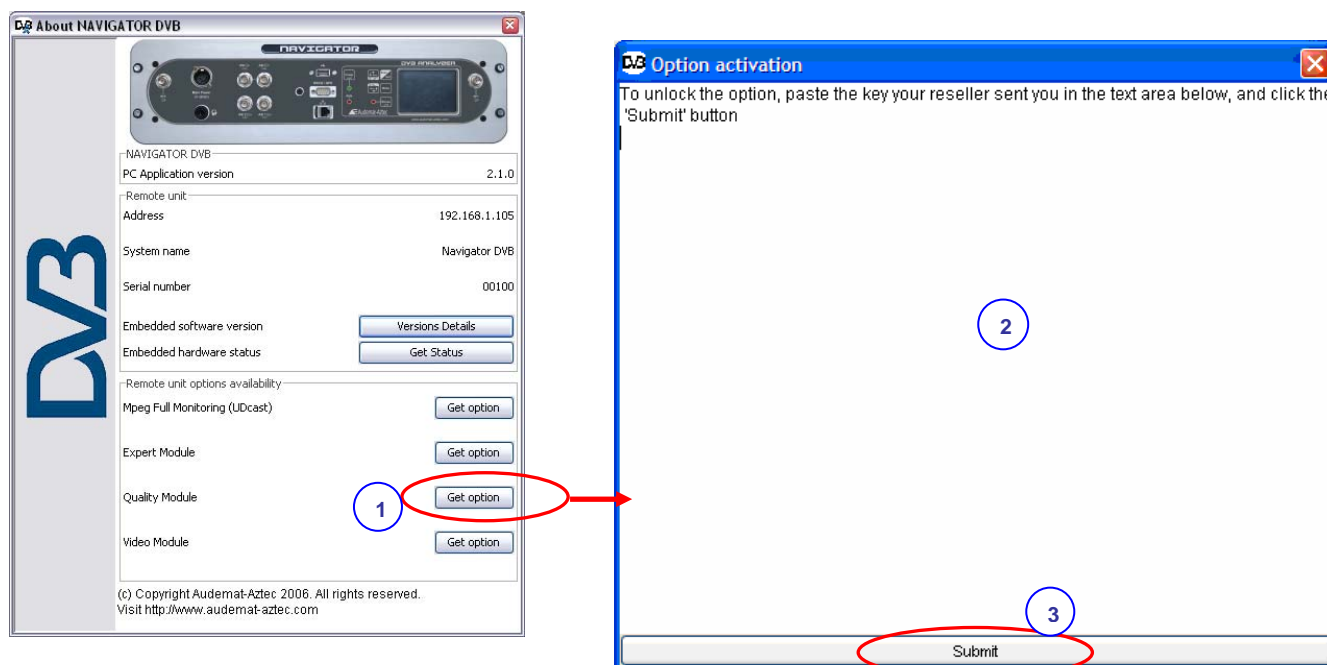
#### 6.2.1.1 To install an option

The process is identical regardless of the option. First, contact the sales department who will let you know how to obtain the option CD.

- Copy the “product-key” available on the Audemat-Aztec CD provided by the sales department after purchase of the option:



- Go to the “help” menu of the Navigator DVB application and click on “About”:



- Click on “Get option” on the line of the option you want to install (Quality Module on the above example). 1
- Paste or write the “product key”. 2
- Then click on “Submit” to update the equipment with this option. 3

- Close the application and reboot the equipment.
- “Yes” will appear on the line of the chosen option (instead of “Get option”).

#### **6.2.1.2 Mpeg Full Monitoring Option**

For more Mpeg monitoring measures (cf. sections 6.3.5, 6.3.7, and 6.3.8).

#### **6.2.1.3 DVB-H Option(Expert module)**

With this option, monitor DVB-H and have access to the expert mode (cf. sections 6.3.8 and 6.9).

#### **6.2.1.4 Quality- Video Option**

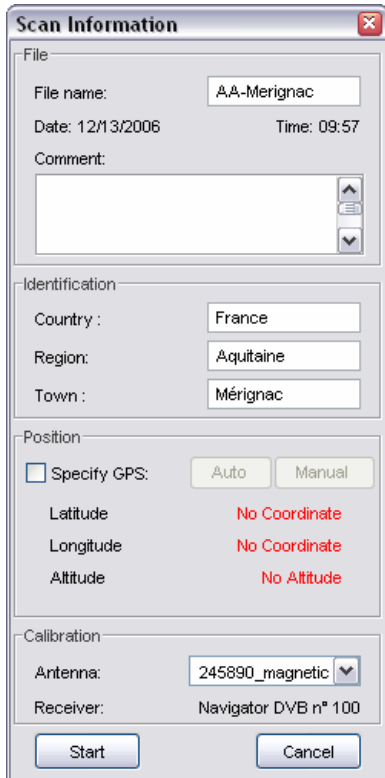
With this option and the supplementary software GoldenEye, quality indicators for measures recorded with the Navigator DVB and imported in GoldenEye format, are interpreted in GoldenEye (cf. GoldenEye user manual).

This option also includes the video module, which allows you to record the video during a campaign launched with the Navigator DVB. With GoldenEye, the video can then be replayed so it can be viewed at the same time as the measures.

## 6.3. Real time measurement

### 6.3.1. Launching a Scan

Click on “Scan” (1) button: a window appears which enables the user to give a name and comments . The file name is mandatory, other information is optional. Once the information is entered, click on “Start”.



The 'Scan Information' dialog box contains the following fields and sections:

- File:**
  - File name:
  - Date: 12/13/2006 Time: 09:57
  - Comment:
- Identification:**
  - Country:
  - Region:
  - Town:
- Position:**
  - ☐ Specify GPS:
  - Latitude: No Coordinate
  - Longitude: No Coordinate
  - Altitude: No Altitude
- Calibration:**
  - Antenna:
  - Receiver:

Buttons:

← File name **(MANDATORY)**

← Comments (optional)

← Geographical identification (optional)

← GPS Position (optional), specify whether it is manual or automatic

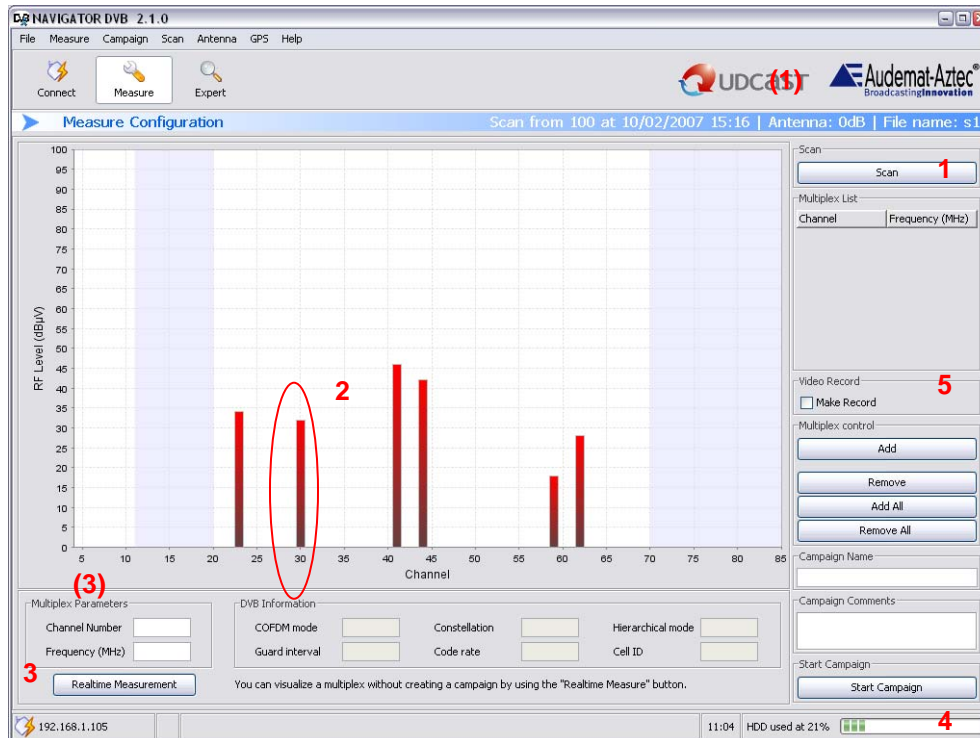
← Antenna correction that needs to be applied

**Note: Scanning will temporally disable the front screen.**

After a scan, you have the possibility to view a multiplex.

Select the multiplex you want to view (example 2) on the screen and click on the button “Real-time measurement” (3). Displayed video and data is not recorded.

**Note: there is no need to run a campaign to access measures.**

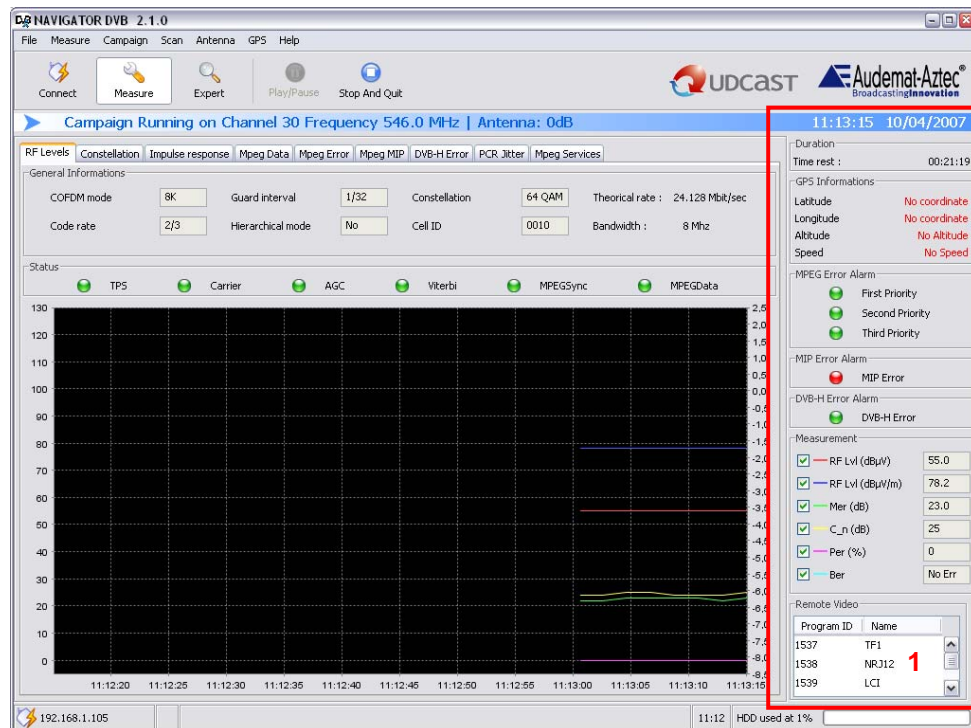


In the status bar, progress bar shows the used space on the Navigator DVB hard drive disk (4).

Section 5: if the box is checked, the video will be recorded when the next campaign is launched. The time displayed on measure screens will represent remaining time rather than elapsed time, and the “Play/Pause” will be deactivated.



### 6.3.2. RF Levels



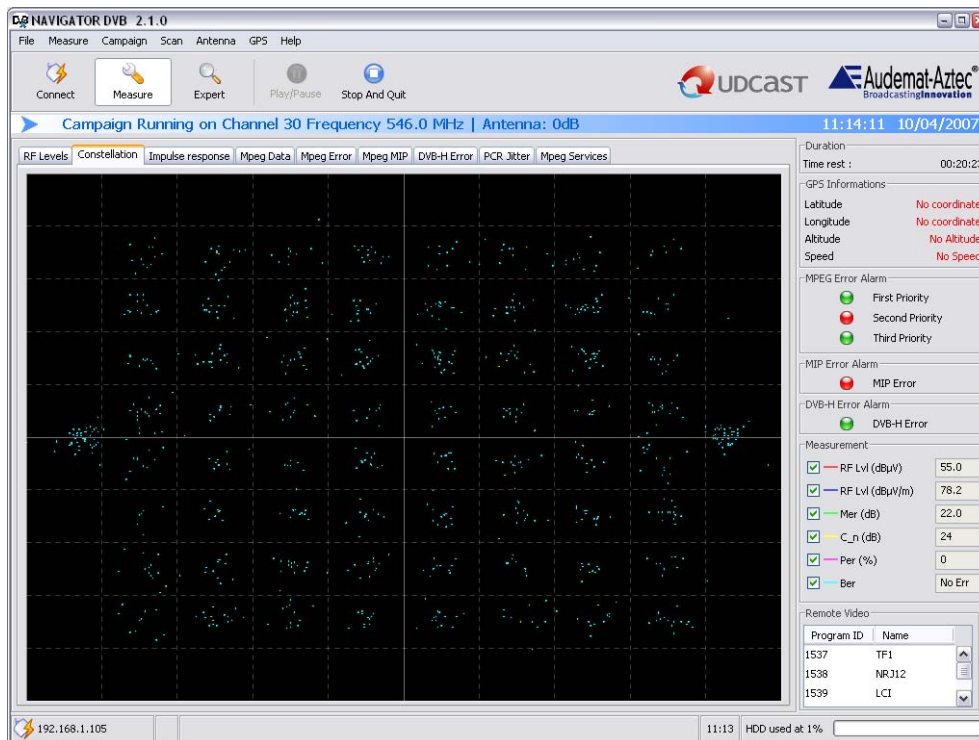
The following information is available:

- RF levels in dBμV
- MER (Modulation Error Ratio) in dB
- C/N (Carrier to Noise ratio) in dB
- PER (Packet Error Ratio) in %
- BER (Bit Error Rate)

During a campaign or in realtime mode, the video can be watched in realtime when selecting a channel from the list (1). A window pops up with the stream video.

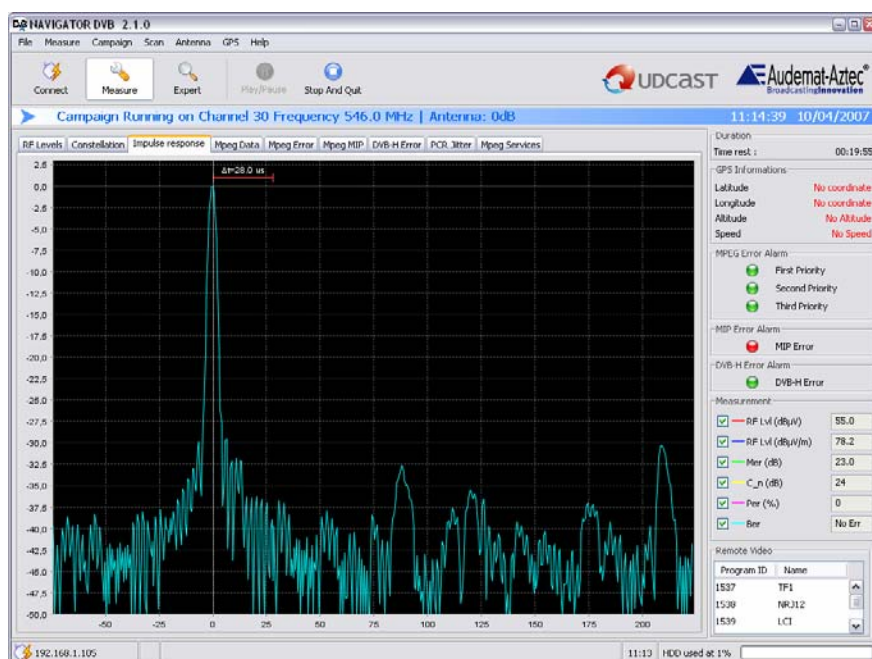
The panel on the right is available with every « Measure » tab.

### 6.3.3. Constellation :



The graphics represents modulation constellations giving indications regarding possible modulation errors (phase, quadrature), as well as “pilot carriers” positions.

### 6.3.4. Guard time: impulse response

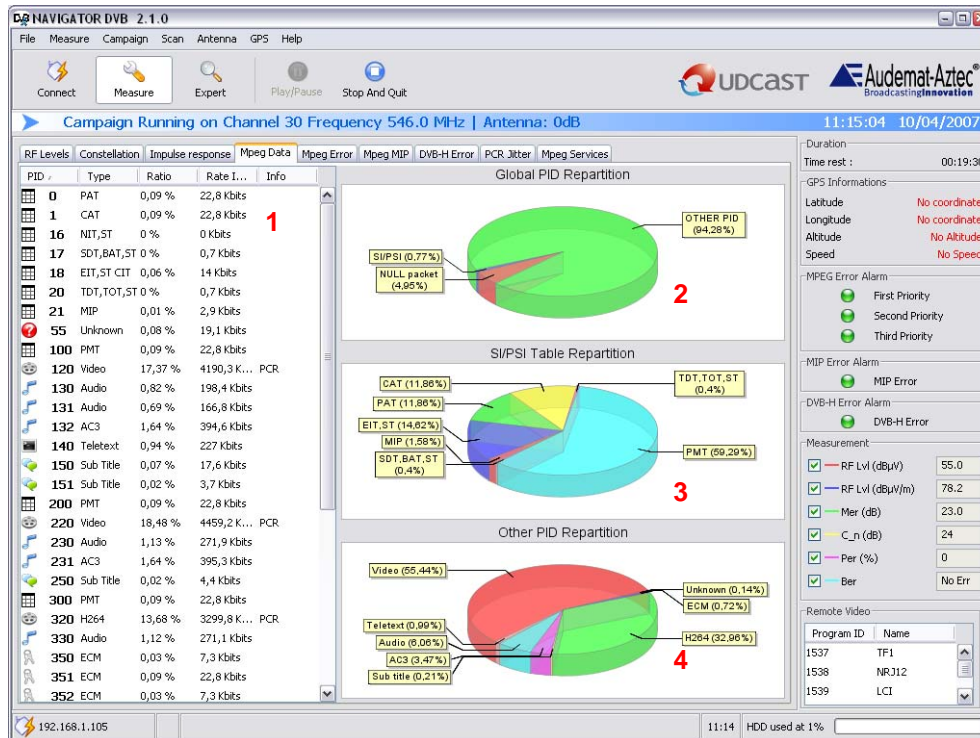


- Guard interval automatically calculated according to the type of modulation (see table below)
- Dynamic amplitude: 30dB.
- Time window: time of a COFDM /3 symbol ( $T_u$ ).

Frequency Domain Parameters		8K mode				4K mode				2K mode			
Number of carriers	K	6817				3409				1705			
Value of carrier number	Kmin	0				0				0			
Value of carrier number	Kmax	6816				3408				1704			
Elementary period	T	7/64				7/64				7/64			
Duration	$T_u$	896 $\mu$ s				448 $\mu$ s				224 $\mu$ s			
Carrier Spacing	$1/T_u$	1 116 Hz				2 232 Hz				4 464 Hz			
Spacing between carriers	Kmin a $(K-1)/T_u$	7,61 MHz				7,61 MHz				7,61 MHz			
Time Domain Parameters		8K mode				4K mode				2K mode			
Useful symbol Part	$T_u$	8192T 896 $\mu$ s				4096T 448 $\mu$ s				2048T 224 $\mu$ s			
Guard Interval Part	$\Delta/T_u$	1/4	1/8	1/16	1/32	1/4	1/8	1/16	1/32	1/4	1/8	1/16	1/32
Guard Interval Duration	$T_g$	2 048T 224 $\mu$ s	1 024T 112 $\mu$ s	512T 56 $\mu$ s	256T 28 $\mu$ s	1 024T 112 $\mu$ s	512T 56 $\mu$ s	256T 28 $\mu$ s	128T 14 $\mu$ s	512T 56 $\mu$ s	256T 28 $\mu$ s	128T 14 $\mu$ s	64T 7 $\mu$ s
Total Symbol Duration	$T_s = \Delta + T_u$	10 240T 1120 $\mu$ s	9 216T 1008 $\mu$ s	8 704T 952 $\mu$ s	8 448T 924 $\mu$ s	5 120T 560 $\mu$ s	4 608T 504 $\mu$ s	4 352T 478 $\mu$ s	4 224T 462 $\mu$ s	2 560T 280 $\mu$ s	2 304T 252 $\mu$ s	2 176T 238 $\mu$ s	2 112T 231 $\mu$ s

**Note:** Beginning of guard interval is always positioned with the method of the “strongest echo”.

### 6.3.5. MPEG Data

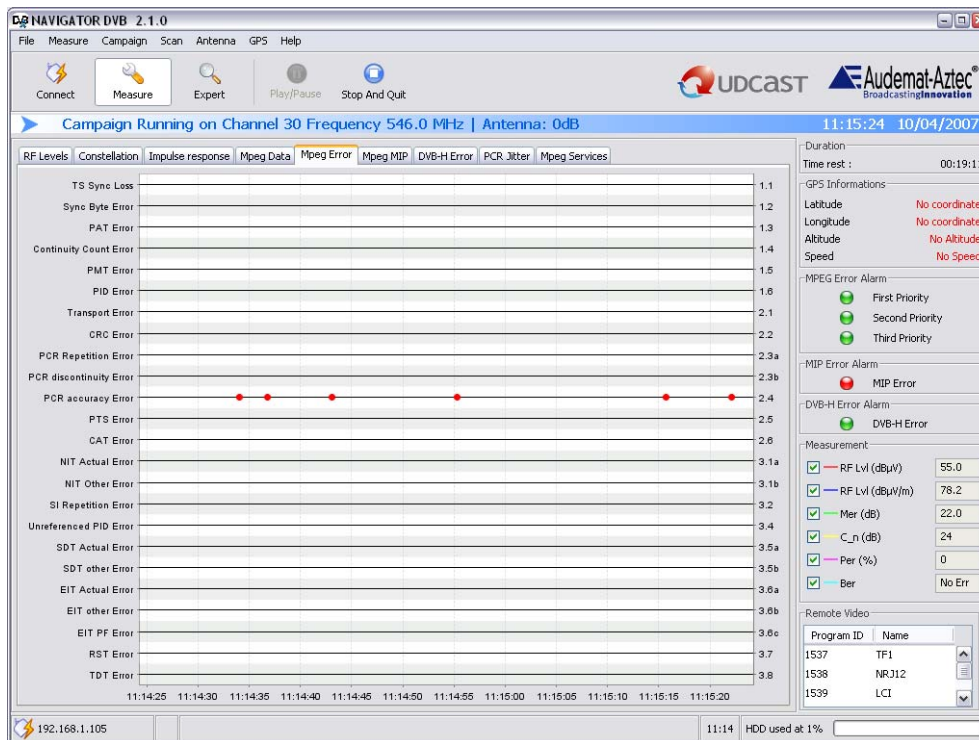


From this tab, varied MPEG-TS information is available in real time.

4 representations:

- 1) List of PIDs with: ID, type, ratio, rate instant, PCR information (1). The Ratio and Instantaneous Rate columns are only available with the Full Mpeg Monitoring option.
- 2) Global PID repartition: SI/PSI, null packet and other PID (2)
- 3) SI/PSI table repartition (3)
- 4) Other PID repartition (4)

### 6.3.6. MPEG error



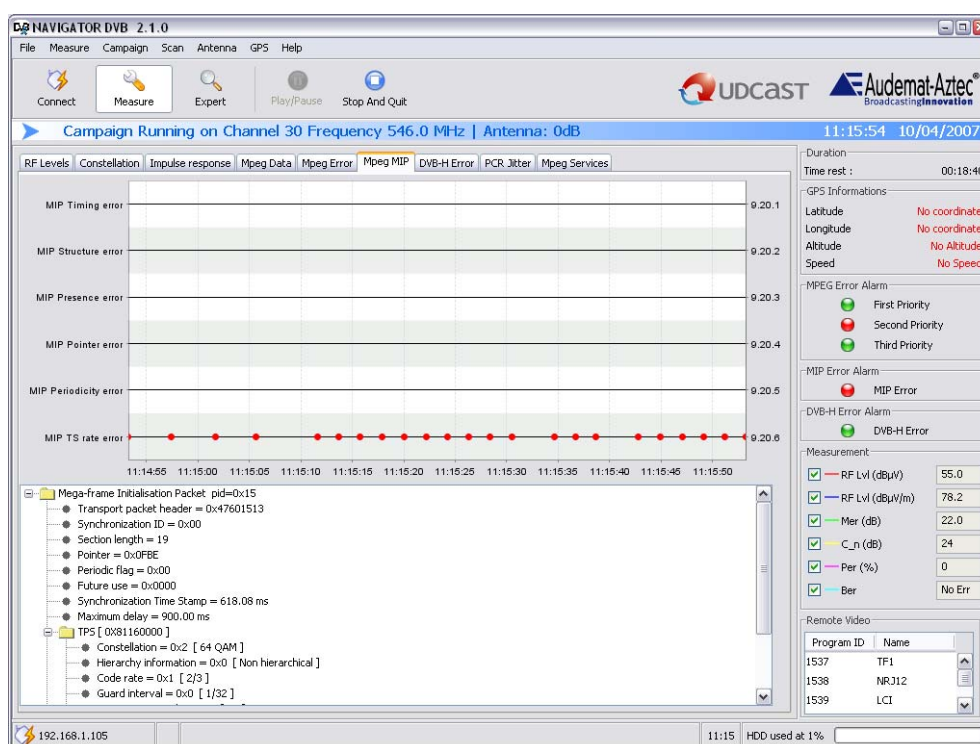
This screen displays errors of the TS throughout time. A “red” mark appears in case of error.

A red point means that there was at least one error during the last measurement. It does not give indication on the exact number of errors.

**Note:** errors triggering thresholds used are those defined by the ETR101290 norm.



### 6.3.7. Mpeg-MIP



**MIP\_timing\_error** : The Synchronization Time Stamp (STS) values inserted in the Mega-frame Initialization Packet (MIP) must be correct. This test checks that successive STS values are self-consistent.

**MIP\_structure\_error** : This test verifies that the syntax of the MIP complies with the specification.

**MIP\_presence\_error** : This test verifies that the MIP is inserted into the transport stream only once per megafame.

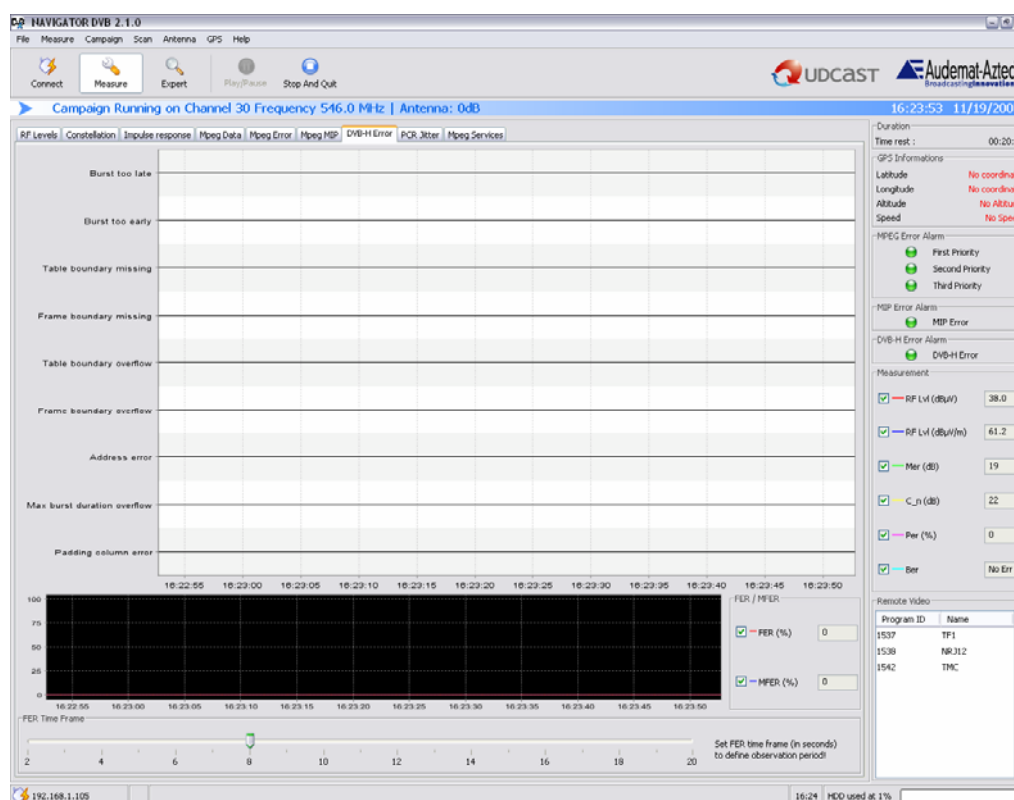
**MIP\_pointer\_error** : The MIP insertion can be at any location in the mega-frame. If the insertion is periodic as defined in the MIP, the MIP location in the mega-frame is constant over time. The MIP can be used to determine the mega-frame size and where each mega-frame starts and ends in the transport stream thanks to the pointer field verified by this test.

**MIP\_periodicity\_error** : In the case of a periodic MIP insertion, the pointer value shall remain constant, as well as the number of packets between each MIP.

**MIP\_ts\_rate\_error** : In a SFN network the modulator settings are transmitted by the tps\_mip. These settings determine the transmission mode and in this way the bit rate of the Transport Stream. This test verifies that the actual Transport Stream data rate is consistent with the DVB-T mode defined by the tps\_mip.

Table content is presented in tree form.

### 6.3.8. DVB-H error (DVB-H option)



The interface displays the following errors:

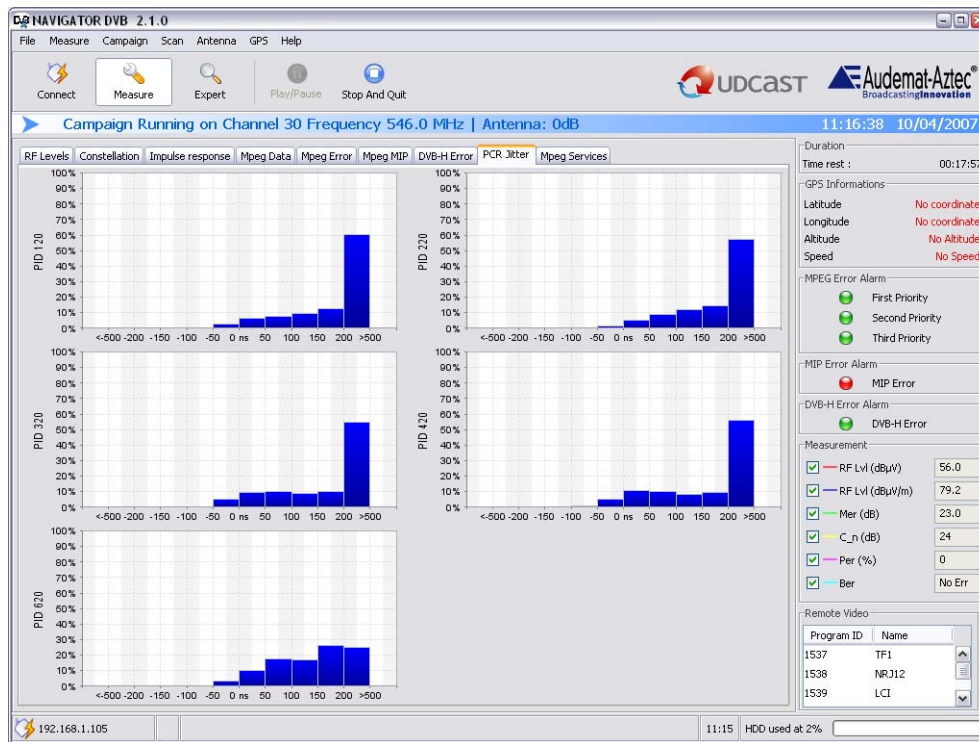
- **burst\_too\_late**: When a burst arrives too late. As the system is already on, no data should be lost. However this may increase the power consumption on the receiver.
- **burst\_too\_early**: When a burst arrives too early. This error is very important as it means the system will be switched on too late, so parts of the next burst will be missing.
- **table\_boundary\_missing**: If we notice that the system has finished sending its MPE sections and now transmits MPE-FEC sections although we didn't see the associated signaling.
- **frame\_boundary\_missing**: If we notice that we have received all the needed MPE-FEC sections and the system didn't inform correctly of the end of these sections using the associated signaling.
- **table\_boundary\_overflow**: If we receive signaling information which announce the end of a table, and that we notice that we still miss some information.
- **frame\_boundary\_overflow**: If we receive signaling information which announce the end of a frame, and that we notice that we still miss some information.
- **address\_error**: During the reconstruction of the MPE-FEC frame, each individual block has its own address. We can detect if this information is not coherent with previous collected data.
- **max\_burst\_duration\_overflow**: A burst must not take too much time in the air. If burst duration is too long, this will be reported.
- **padding\_column\_error**: Check the coherence of padding with header information.

In lower part the interface display FER and MFER evolution:

- **FER** (Frame Error Ratio) is the ratio of Application Data Table containing errors, without MPE-FEC error correction being applied during an observation period.
- **MFER** (MPE FER) is the ratio of uncorrected MPE-FEC frames during an observation period.

At the very bottom of the screen, a slider bar will allow you to set the time frame, in seconds, during which the FER will be measured before its percentage is calculated.

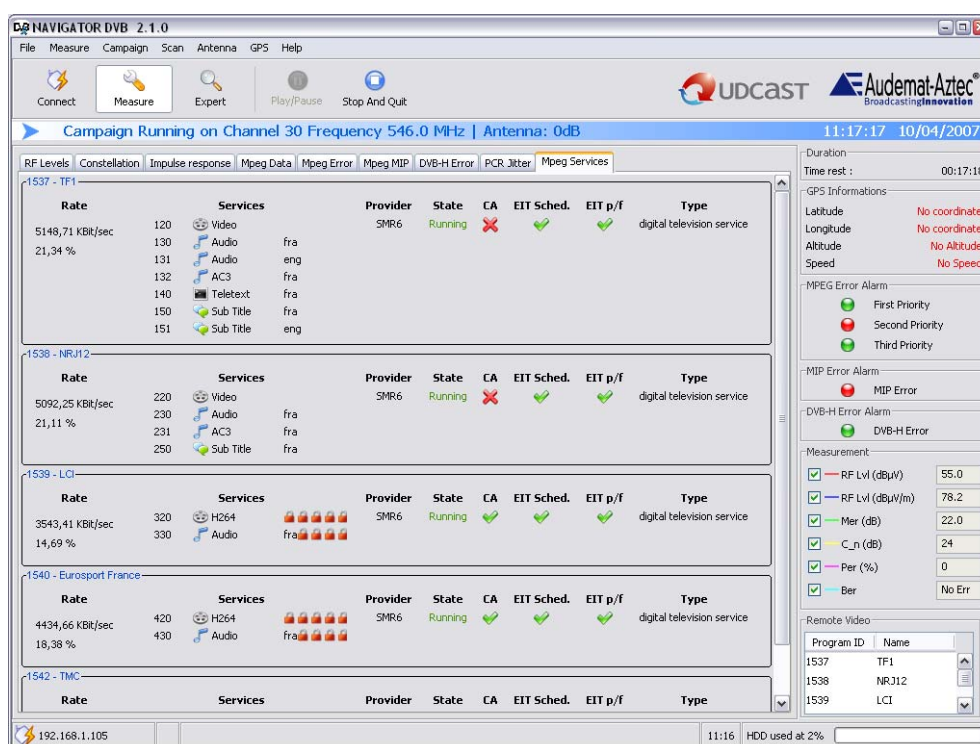
### 6.3.9. PCR Jitter



Each jitter is displaying its percentage repartition of the time value of the PCR. If this value is > 500 ns and/or < -500 ns, the color becomes red.




### 6.3.10. Mpeg Service (MPEG FULL option)



This screen displays multiplex services:

- **ID program :**
  - Identifying number
  - Instantaneous flow
  - Percentage of the global flow
- **Services :**
  - PID number
  - Service type : video, teletext, sub-title, associated metadata ...

#### Note:

- In the case of sub-titles and audio, language is specified.
- Signification of the "padlocks": 
  - The number of padlocks corresponds to the number of ECM used (Entitlement Control Message). ECM is a function of the control word and the services key (used to decode the control word) and is transmitted every 2 seconds.

- 2 information are given when the mouse cursor is on it :
  - PID of the associated ECM
  - CA\_system\_id (defined in the TR 101 162):

CA_system_id values	CA system specifier
0x0000	Reserved
0x0001 to 0x00FF	Standardized systems
0x0100 to 0x01FF	Canal Plus
0x0200 to 0x02FF	CCETT
0x0300 to 0x03FF	MSG Media Services GmbH
0x0400 to 0x04FF	Eurodec
0x0500 to 0x05FF	France Telecom
0x0600 to 0x06FF	Irdeto
0x0700 to 0x07FF	Jerrold/GI/Motorola
0x0800 to 0x08FF	Matra Communication
0x0900 to 0x09FF	News Datacom
0x0A00 to 0x0AFF	Nokia
0x0B00 to 0x0BFF	Norwegian Telekom
0x0C00 to 0x0CFF	NTL
0x0D00 to 0x0DFF	Philips
0x0E00 to 0x0EFF	Scientific Atlanta
0x0F00 to 0x0FFF	Sony
0x1000 to 0x10FF	Tandberg Television
0x1100 to 0x11FF	Thomson
0x1200 to 0x12FF	TV/Com
0x1300 to 0x13FF	HPT - Croatian Post and Telecommunications
0x1400 to 0x14FF	HRT - Croatian Radio and Television
0x1500 to 0x15FF	IBM
0x1600 to 0x16FF	Nera
0x1700 to 0x17FF	Beta Technik
0x1800 to 0x18FF	Kudelski SA
0x1900 to 0x19FF	Titan Information Systems
0x2000 to 0x20FF	Telefónica Servicios Audiovisuales
0x2100 to 0x21FF	STENTOR (France Telecom, CNES and DGA)
0x2200 to 0x22FF	Tadiran Scopus
0x2300 to 0x23FF	BARCO AS
0x2400 to 0x24FF	StarGuide Digital Networks
0x2500 to 0x25FF	Mentor Data System, Inc.
0x2600 to 0x26FF	European Broadcasting Union
0x4700 to 0x47FF	General Instrument
0x4800 to 0x48FF	Teleman
0x4900 to 0x49FF	Digital TV Industry Alliance of China
0x4A00 to 0x4A0F	Tsinghua Tongfang
0x4A10 to 0x4A1F	Easycas

- Service name : name of the TV channel
- Provider name: name of the provider.
- Running state : corresponds to the services state as defined in the norm EN 300 468 :

Value	Meaning
0	undefined
1	not running
2	starts in a few seconds (e.g. for video recording)
3	pausing
4	running
5 to 7	reserved for future use

➤ **CA (conditional Access) :**

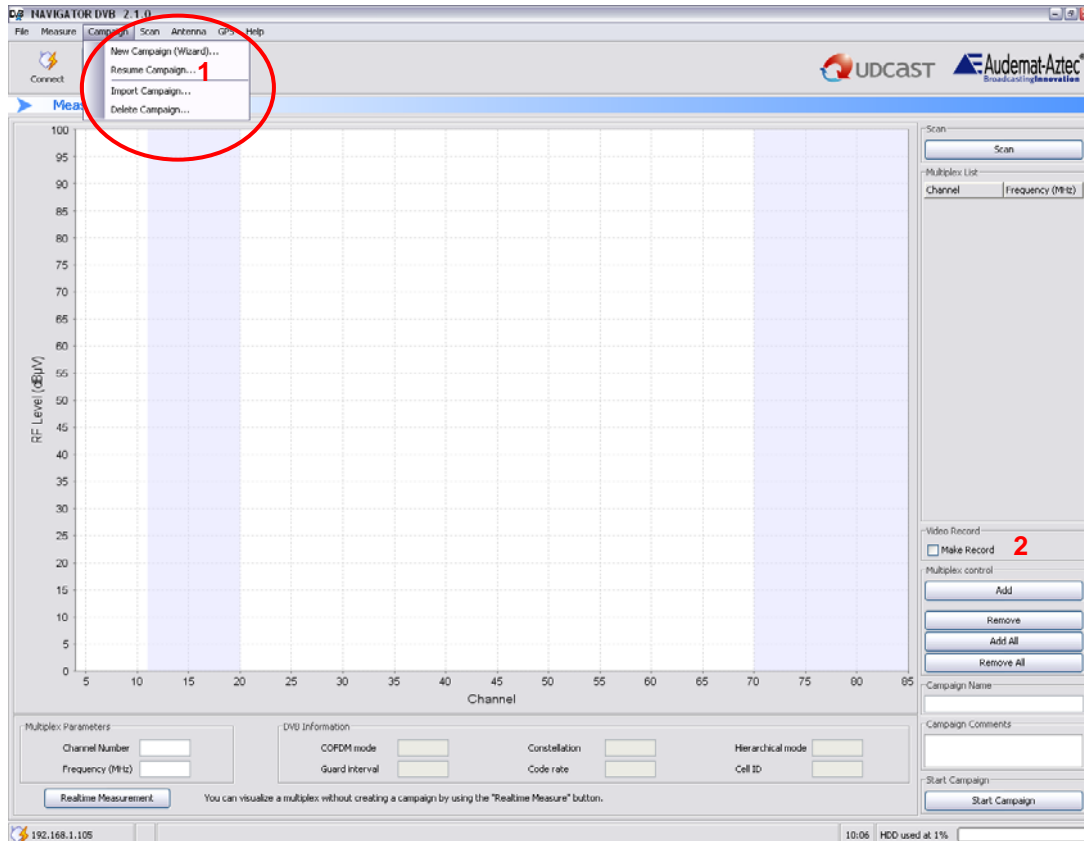
- yes: if the whole services are coded
- no:
  - either no service is coded
  - or some services are coded (but not continuously), in this case a symbol “padlock” is associated to coded services in the column “services” during coding.

- **EIT sched. (EIT Schedule flag)** : defined in the SDT table ( Service description Table) of the norm EN 300 468.
  - 1: if programming information is available for all services of all present multiplex in the current Transport Stream.
  - 0 : in the contrary case
- **EIT p/f (EIT\_present\_following\_flag)**: defined in the SDT table (Service description Table) of the norm EN 300 468.
  - 1: if the information concerning the program in process and the following are available for the services of the multiplex concerned.
  - 0 : in the contrary case
- **Type** : corresponds to “service description” defined in the norm EN 300 468 like “Service type coding”

service_type	Description
0x00	reserved for future use
0x01	digital television service (see note 1)
0x02	digital radio sound service (see note 2)
0x03	Teletext service
0x04	NVOD reference service (see note 1)
0x05	NVOD time-shifted service (see note 1)
0x06	mosaic service
0x07	reserved for future use
0x08	reserved for future use
0x09	reserved for future use
0x0A	advanced codec digital radio sound service
0x0B	advanced codec mosaic service
0x0C	data broadcast service
0x0D	reserved for Common Interface Usage (EN 50221 [39])
0x0E	RCS Map (see EN 301 790 [7])
0x0F	RCS FLS (see EN 301 790 [7])
0x10	DVB MHP service
0x11	MPEG-2 HD digital television service
0x12 to 0x15	reserved for future use
0x16	advanced codec SD digital television service
0x17	advanced codec SD NVOD time-shifted service
0x18	advanced codec SD NVOD reference service
0x19	advanced codec HD digital television service
0x1A	advanced codec HD NVOD time-shifted service
0x1B	advanced codec HD NVOD reference service
0x1C to 0x7F	reserved for future use
0x80 to 0xFE	user defined
0xFF	reserved for future use
NOTE 1: MPEG-2 SD material should use this type.	
NOTE 2: MPEG-1 Layer 2 audio material should use this type.	

## 6.4. Launch a campaign via the application

Once the connection has been established, the campaign configuration screen is displayed.



This interface allows the user to:

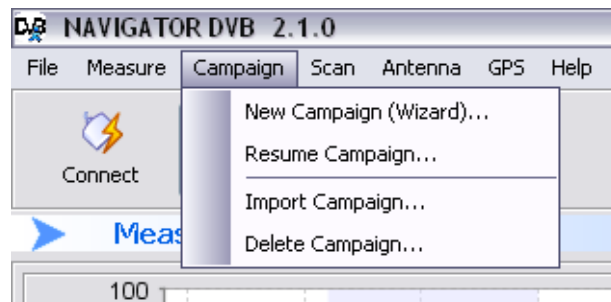
- Do a scan on the band.
- Type the frequency or the channels.
- Type the latitude and the longitude if the user does not have GPS data.
- Start a measurement session depending on the frequency/channel.
- Form a list of channel which will be successively used during the campaign.
- Start a campaign.

The user can run a campaign directly on the ASI input.

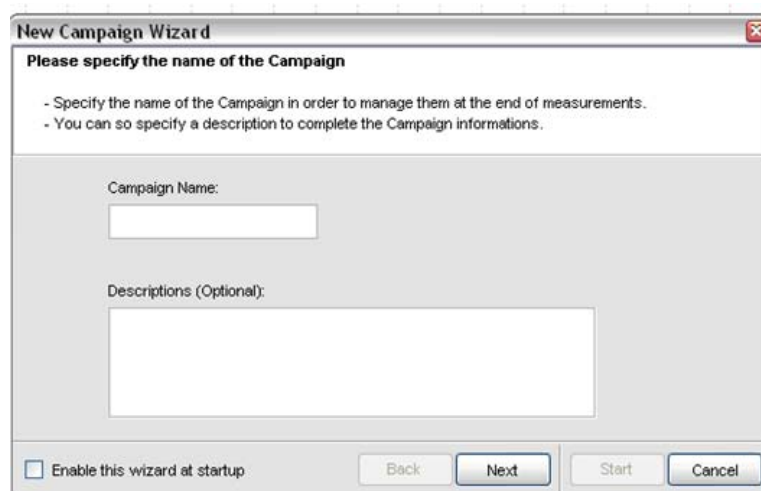
## 6.4.1. Campaign Configuration

### 6.4.1.1 With the wizard

To start a campaign with the wizard, click on the menu 'Campaign' → 'New Campaign (Wizard)' (see figure above, 1)



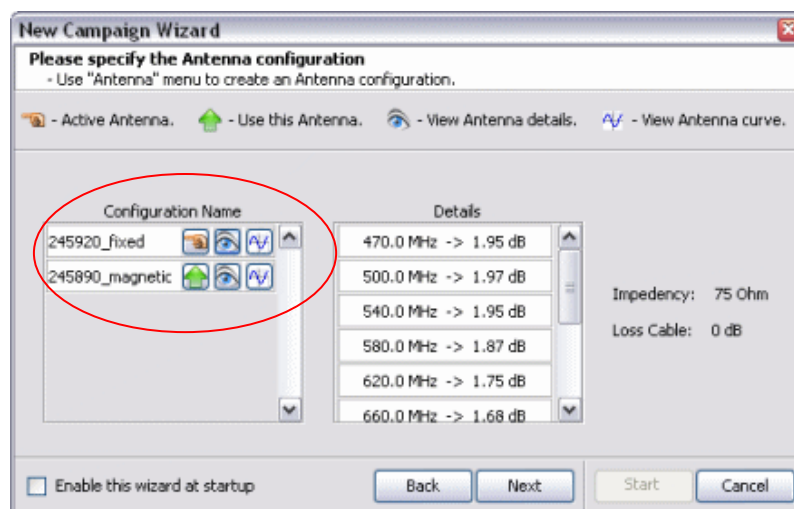
A wizard automatically starts to help configure the campaign:






- 1) Give a name to the campaign: MANDATORY  
It's possible to add a description of the campaign, OPTIONAL.

➔ Click on "Next"

- 2) Antenna configuration: possibility of activate the configuration and display the details of the configuration (example below):



-  : indicates the used antenna

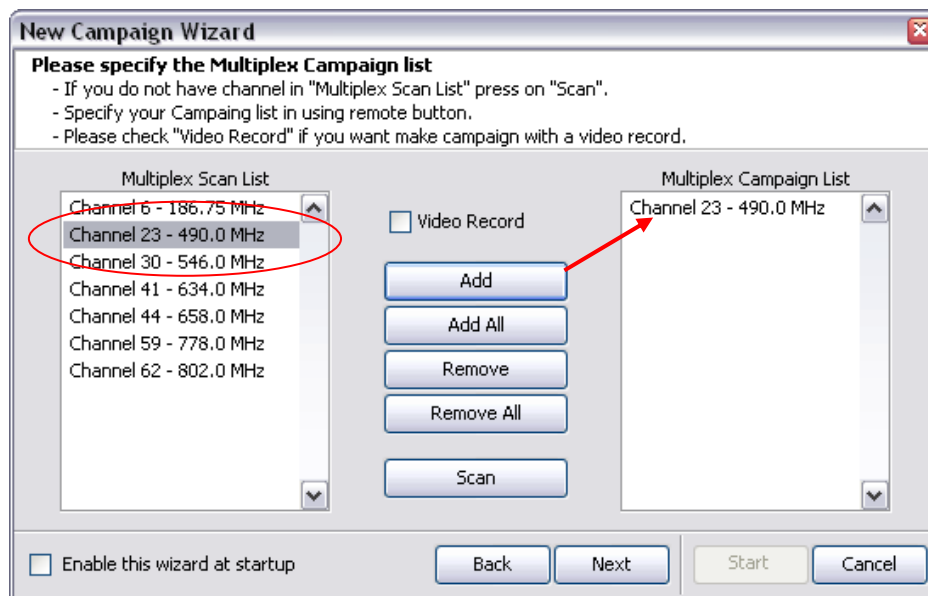
-  : indicates the details of the antenna values
-  : to select the configuration
-  : to visualize the antenna curves

➔ Click on "Next"

3) Add the multiplex campaign list :

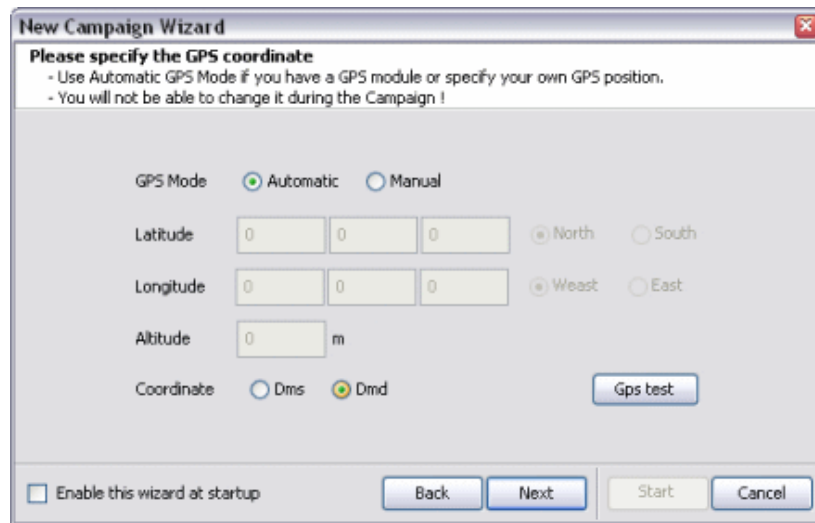
- If there is no MPX list, press on "Scan" in order to obtain a "Multiplex Scan List". A pop-up of scan creation appears (like on the main window).
- Click on the "Add" button (add for one Channel or "Add All" to add the entire list. You can use the "Remove" button if necessary to put back your channel in the Multiplex Scan list.
- Check "Video Record" to record videos.

Example :



➔ Click on "Next"

- 4) **GPS configuration:** enter your GPS position if necessary or use automatic mode.



**New Campaign Wizard**

**Please specify the GPS coordinate**

- Use Automatic GPS Mode if you have a GPS module or specify your own GPS position.
- You will not be able to change it during the Campaign !

GPS Mode: ☒ Automatic ☐ Manual

Latitude:    ☒ North ☐ South

Longitude:    ☒ West ☐ East

Altitude:  m

Coordinate: ☐ Dms ☒ Dmd

☐ Enable this wizard at startup

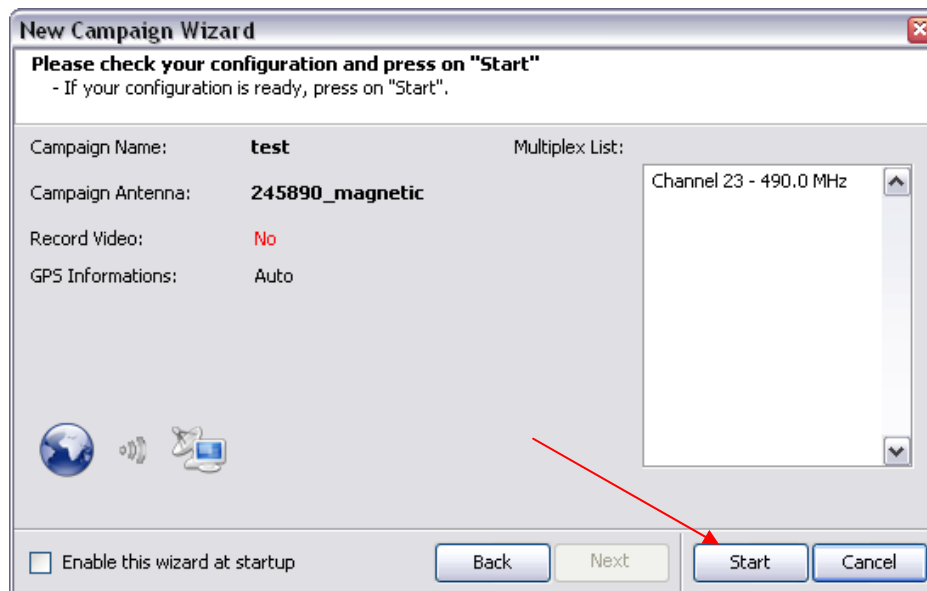
**Dms:** Degree Minute Second

**Dmd:** Degree Minute

**GPS test:** allows to test if GPS receiver works correctly

→ Click on "Next"

- 5) **Last step:** once the configuration is done, press on Start.



**New Campaign Wizard**

**Please check your configuration and press on "Start"**

- If your configuration is ready, press on "Start".

Campaign Name: **test** Multiplex List:

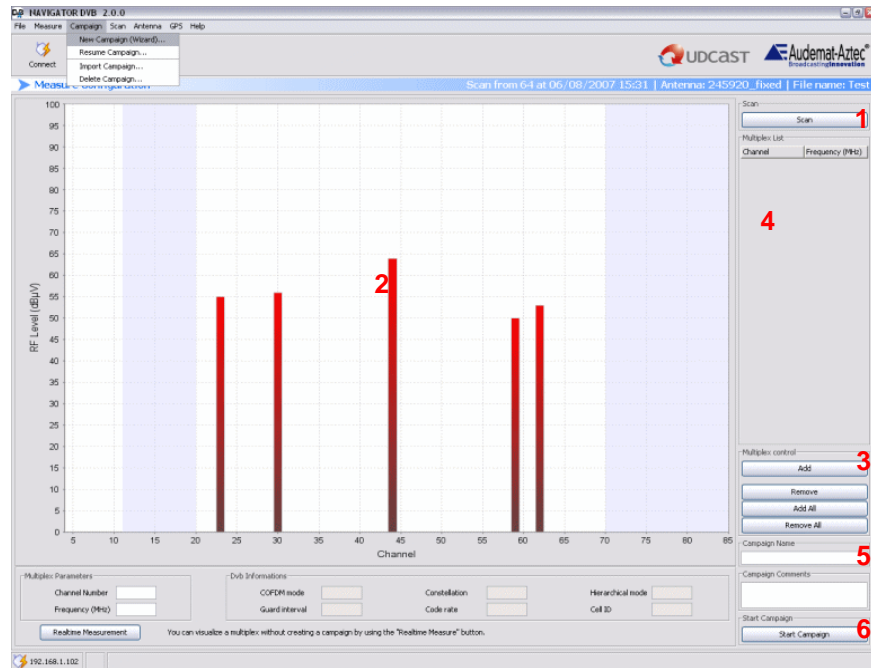
Campaign Antenna: **245890\_magnetic** Channel 23 - 490.0 MHz

Record Video: **No**

GPS Informations: **Auto**

☐ Enable this wizard at startup

### 6.4.1.2 Without the wizard

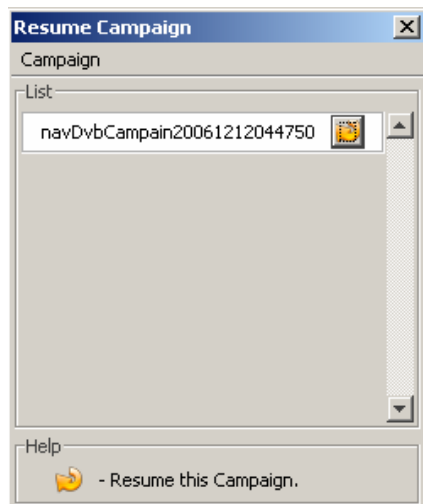


- If necessary, start a new scan: click on the “Scan” button (1)
- On the scan :
  - Click on a bar (2) then click on “Add” (3) or double click on a bar
  - Channel related information appears in the zone (4),
  - Name the campaign in the zone (5),
  - Click on the “Start Campaign” button (6).



### 6.4.2. "Resume Campaign"

Click on the menu "Campaign/Resume Campaign"



This function enables to resume a campaign stopped for any reasons (battery problems...)

Just click on the "Resume button" of a campaign to carry on.

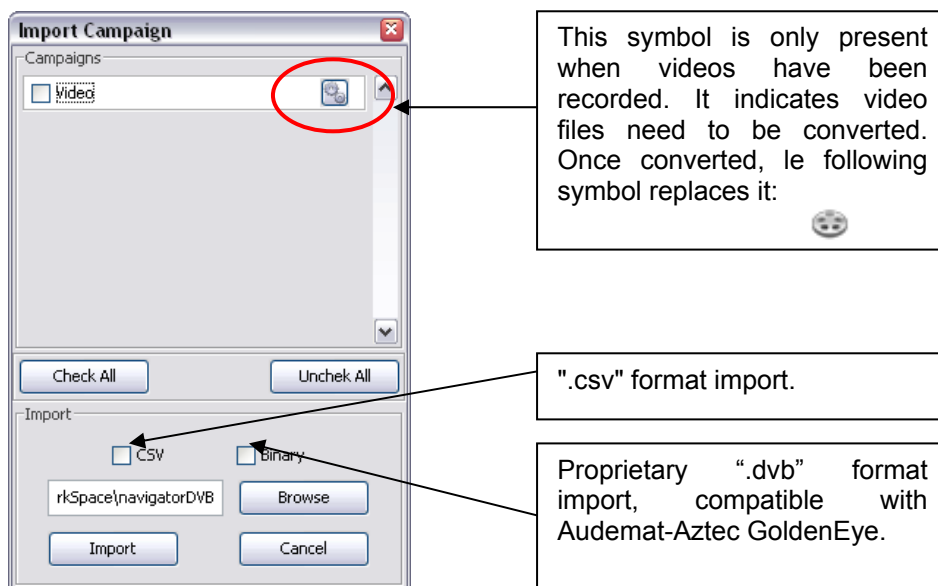
This functionality is not available for campaigns with video.

### 6.4.3. "Import Campaign"

When the campaign is done, results can be imported on the local computer.

Click on the menu "Campaign/Import Campaign". Previously recorded campaigned are then listed.

You may check one or several campaigns (for every one of them, click on "Check All") in order to import them in CSV and/or binary format.



**Note:** Binary files are strictly for use with Audemat-Aztec application reader, GoldenEye.

**Note:** The front screen is temporarily deactivated when importing and converting files.

The list of imported parameters is:

- Channel number
- Frequency (in KHz)
- Duration (in seconds)
- Validity of theGPS (0 or 1)
- Validity of RF reception (0 or 1)
- Validity MPEG reception (0 or 1)
- GPS Latitude
- GPS longitude
- GPS altitude
- GPS speed
- RF level (dBμV)
- Mode (see below)
- AGC-carrier-TPS-Viterbi-MPEGSync-MPEGData (0 or 1)
- UncorrectMPEG (proprietary code)
- GuardInterval (see below)
- Constellation (see below)
- HierarchicalMode (see below)
- CodeRate, CellID
- MER
- BER
- PER
- C/N
- MPEGErrors
- DVB-H errors
- FER
- MFER.
- Flag 1
- Flag 2

### Correspondence Matrix:

	0	1	2	3	4
Mode COFDM	2K	4K	8K		
Constellation	QPSK	16 QAM	64 QAM		
Guard interval	1/32	1/16	1/8	1/4	
Code rate	1/2	2/3	3/4	5/6	7/8
Hierarchical mode	No	Hierachical $\alpha = 1$	Hierachical $\alpha = 2$	Hierachical $\alpha = 4$	-

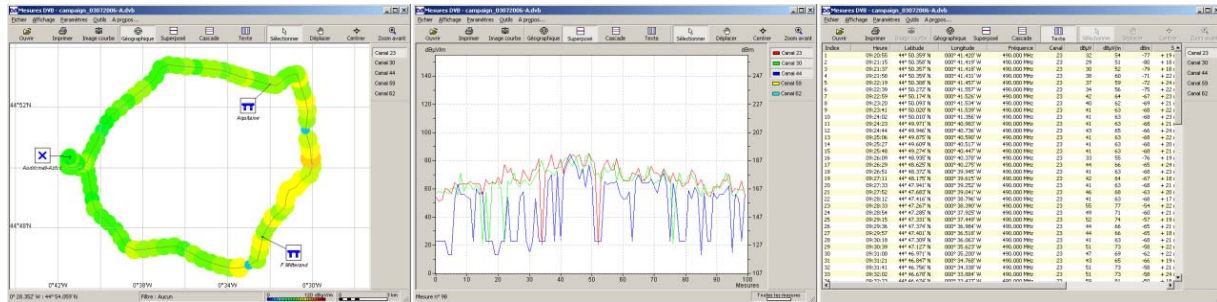
Example of CSV format imported data, viewed in Microsoft Excel:

A	B	C	L	S	V	Z	AA	AB	AC	AD	AE	AI
channel	frequency	seconds	RFLevel	MPEGData	Constellation	Mer	Ber	Per	C_n	MPEGErrors	MIPErrors	Flag
30	546000	1191489130	55	1	2	22	0	0	24	0	0	0
30	546000	1191489133	55	1	2	22	0	0	24	0	0	1
30	546000	1191489135	55	1	2	23	0	0	25	1024	1	0
30	546000	1191489137	55	1	2	23	0	0	25	0	1	0
30	546000	1191489139	55	1	2	23	0	0	24	0	1	1
30	546000	1191489141	55	1	2	23	0	0	24	0	0	0
30	546000	1191489144	55	1	2	22	0	0	24	0	0	0
30	546000	1191489146	55	1	2	23	0	0	25	0	1	0
30	546000	1191489148	55	1	2	23	0	0	25	1024	1	0
30	546000	1191489150	55	1	2	23	0	0	25	0	0	0
30	546000	1191489152	55	1	2	23	0	0	24	0	1	0
30	546000	1191489154	55	1	2	23	0	0	25	0	0	0
30	546000	1191489156	55	1	2	23	0	0	24	0	1	0

**Note :** It may be necessary to convert the data for the format to be usable with Microsoft Excel:

- go to the menu 'Data' → 'Text to Columns...',
- choose 'Delimited' for file type and click on "Next",
- check 'Comma' as a delimiter and click on "Finish".

Import examples in binary format, displayed in GoldenEye (see the GoldenEye user manual for more details):



#### 6.4.4. “Delete a Campaign”

Click on the ‘Campaign’ → ‘Delete Campaign’ menu to delete a campaign.

### 6.5. « Measure » Menu

#### Menu « Join Running Measure »

This command will allow to join a campaign (or measure) previously started via the front screen, with the java application.

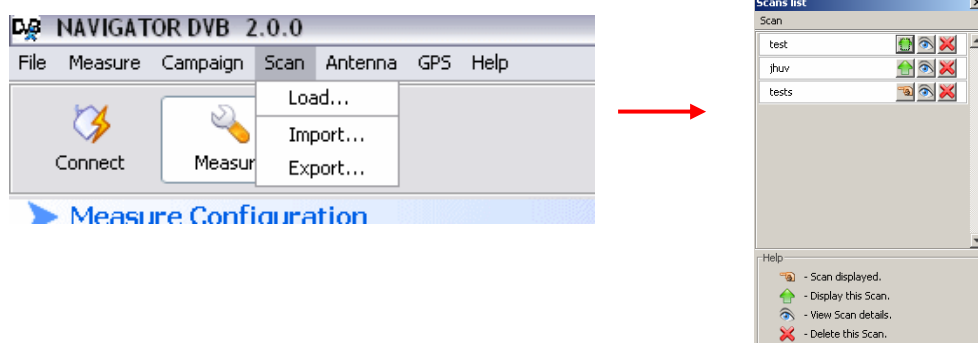
Once the campaign or real-time is launched, click on the menu ‘Measure’ → ‘Join Running Measure’ to view additional information.



**Note:** With multiple channels, MPEG data, PCR, Services and video stream are not available.

## 6.6. Scan Menu

### 6.6.1. “Load”

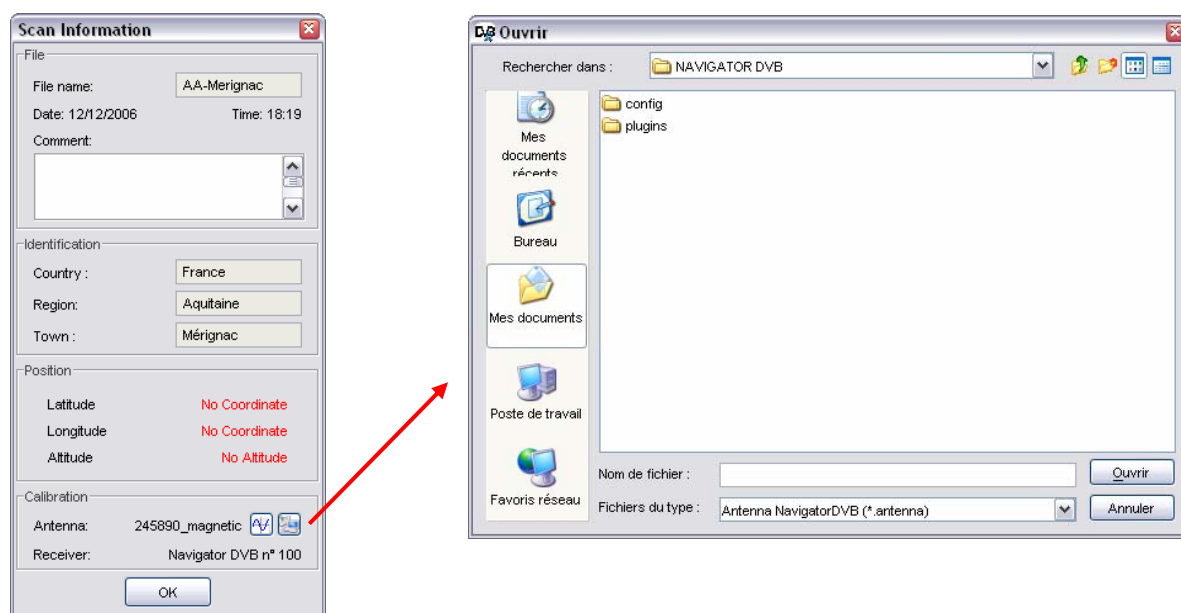


It allows scan selection within the list of previously named and recorded scans.

It is possible to view recorded data and possibility to change the antenna configuration associated to the scan.



: displays scan information:



### 6.6.2. “Import”

Enables to import scans in ‘scan’ format from the Navigator to the PC.

- Click on the “Scan/Import” menu.
- Select the location where the file in ‘.scan’ format should be imported.



**Note:** The front screen is temporarily deactivated when importing files.

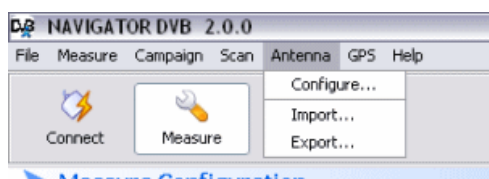
### 6.6.3. “Export”

Enables to export recorded scans from the PC to the Navigator.

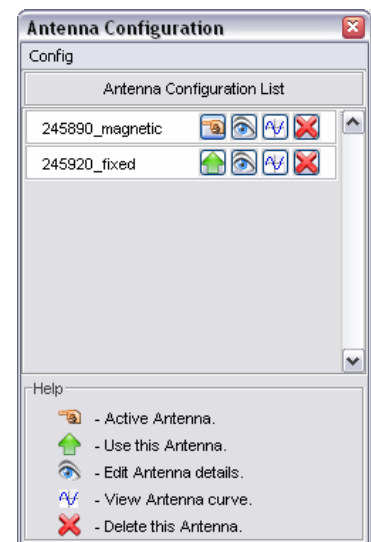
Click on the “Scan/Export” menu.

**Note:** The front screen is temporarily deactivated when exporting files.



## 6.7. Menu Antenna



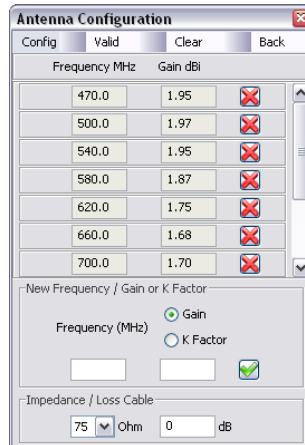
Click on ‘Antenna’ → ‘Configure...’ to display the configuration window:



### 6.7.1. Modify antenna configuration

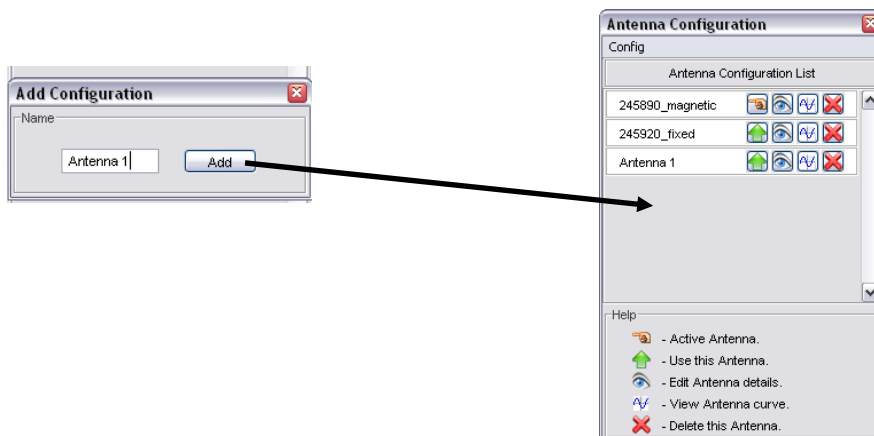
- To modify an antenna configuration, click on  ; the configuration window opens.
- Manually enter each point on the response curve: frequency (value in MHz) and Gain (in dB) or K Factor. If “K Factor” is checked, the software converts the entered value in gain.
- Valid  each new frequency.
- Impedance on your antenna can be chosen, cable related loss can also be added.

- **Caution: Do not forget to click on the “Valid” menu or changes will be lost.**



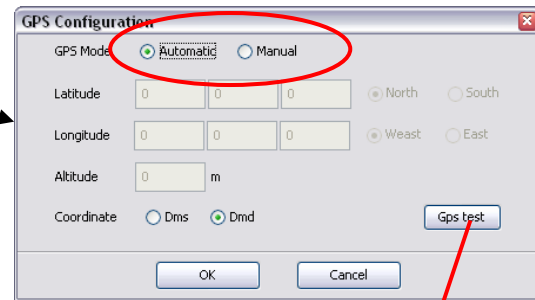
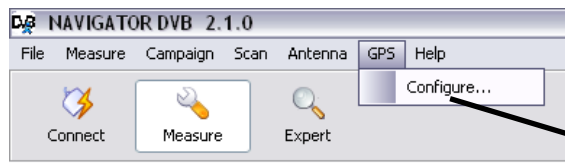
### 6.7.2. Configure a new antenna

- Click on the “Config/new” menu.
- Proceed as with modifications
- Click on “Valid”
- A new dialog box appears which prompts for the name of the new configuration.



Via the “antenna” menu, the user can import or export previously recorded antenna configurations.

## 6.8. GPS Menu



Two options :

- « Automatic »

Click on the “GPS test” button to access GPS information (Latitude, Longitude, Altitude, and speed). It will verify that the GPS is properly connected and that the data is correctly transmitted.

- « Manual »

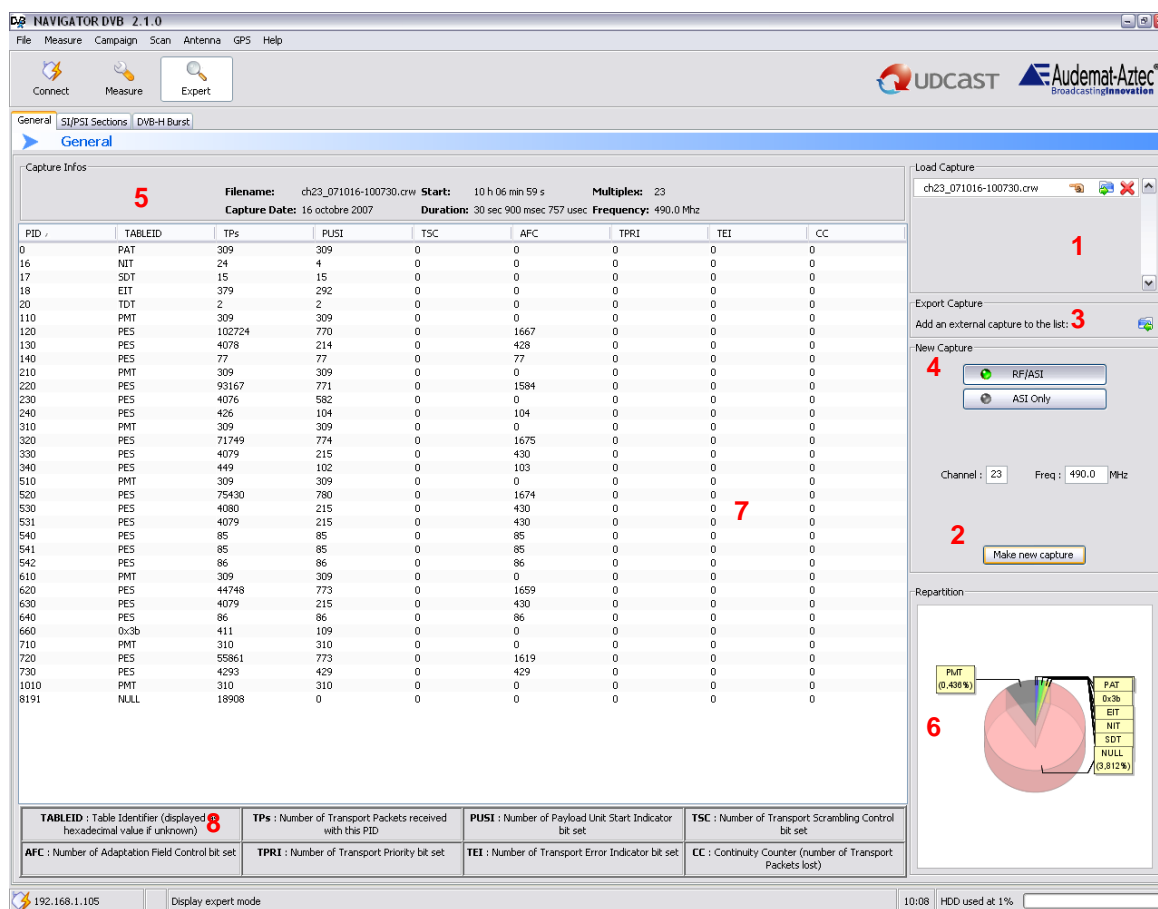
Data must be entered manually; the “GPS test” button is deactivated.



## 6.9. EXPERT Module (OPTION)

See section 6.2.1 to activate this option.

### 6.9.1. “General” Tab



**5** Capture Infos

Filename: ch23\_071016-100730.crw Start: 10 h 06 min 59 s Multiplex: 23  
 Capture Date: 16 octobre 2007 Duration: 30 sec 900 msec 757 usec Frequency: 490.0 MHz

PID	TABLEID	TPs	PUSI	TSC	AFC	TPRI	TEI	CC
0	PAT	309	309	0	0	0	0	0
16	MT	24	4	0	0	0	0	0
17	SDT	15	15	0	0	0	0	0
18	ET	379	292	0	0	0	0	0
20	TOT	2	2	0	0	0	0	0
110	PMT	309	309	0	0	0	0	0
120	PES	102724	770	0	1667	0	0	0
130	PES	4078	214	0	428	0	0	0
140	PES	77	77	0	77	0	0	0
210	PMT	309	309	0	0	0	0	0
220	PES	93167	771	0	1584	0	0	0
230	PES	4076	582	0	0	0	0	0
240	PES	426	104	0	104	0	0	0
310	PMT	309	309	0	0	0	0	0
320	PES	71749	774	0	1675	0	0	0
330	PES	4079	215	0	430	0	0	0
340	PES	449	102	0	103	0	0	0
510	PMT	309	309	0	0	0	0	0
520	PES	75430	780	0	1674	0	0	0
530	PES	4080	215	0	430	0	0	0
531	PES	4079	215	0	430	0	0	0
540	PES	85	85	0	85	0	0	0
541	PES	85	85	0	85	0	0	0
542	PES	86	86	0	86	0	0	0
610	PMT	309	309	0	0	0	0	0
620	PES	44748	773	0	1659	0	0	0
630	PES	4079	215	0	430	0	0	0
640	PES	86	86	0	86	0	0	0
660	0x3b	411	109	0	0	0	0	0
710	PMT	310	310	0	0	0	0	0
720	PES	55861	773	0	1619	0	0	0
730	PES	4293	429	0	429	0	0	0
1010	PMT	310	310	0	0	0	0	0
8191	NULL	18908	0	0	0	0	0	0

**1** Load Capture

ch23\_071016-100730.crw

**2** Make new capture

**3** Export Capture

Add an external capture to the list:

**4** New Capture

RF/ASI

ASI Only

Channel: 23 Freq: 490.0 MHz

**5** Repartition

PMT (0.438%)

PAT (0.438%)

0x3b (0.438%)

ET (0.438%)

MT (0.438%)

SDT (0.438%)

NULL (3.812%)

**6**

**7**

**8**

TABLEID : Table Identifier (displayed hexadecimal value if unknown)

TPs : Number of Transport Packets received with this PID

PUSI : Number of Payload Unit Start Indicator bit set

TSC : Number of Transport Scrambling Control bit set

AFC : Number of Adaptation Field Control bit set

TPRI : Number of Transport Priority bit set

TEI : Number of Transport Error Indicator bit set


CC : Continuity Counter (number of Transport Packets lost)

192.168.1.105 Display expert mode 10:08 HDD used at 1%

(1)



Click on  to select a file.

Click on  to import it from the equipment to the local PC.

Click on  to delete it.

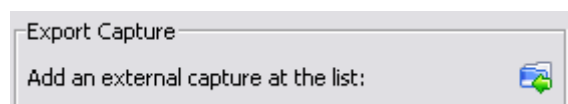


indicates which file is currently selected; its data is displayed in the window.

Clicking on "Make new capture" (2) allows up to 20 captures, they appear in the 'Load Capture' zone.

**Note: The front screen is temporarily deactivated after clicking on "Make capture".**

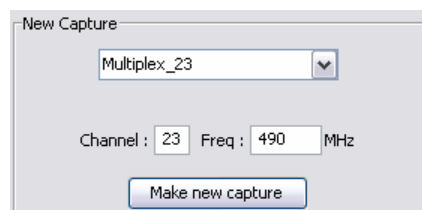
It is also possible to export them from the PC to the equipment via the 'export capture' menu (3):





- **Make new capture (4)**

A 30s capture is saved and analyzed.

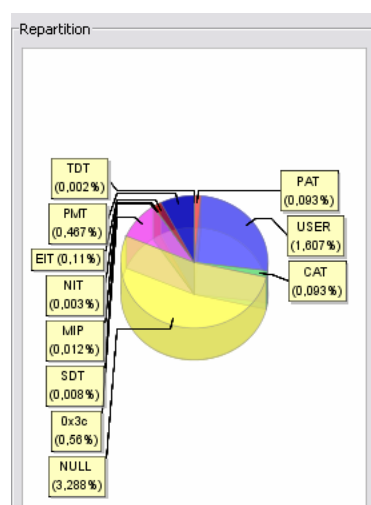


- **Capture Info (5)**

Name, date and duration of the currently loaded capture.

- **Repartition (6)**

PSI/SI table repartition representation in percentage



- **Table data (7)**

- **PID Table**

PID: Packet Identifier (displayed in decimal).

- **TABLEID** : Table Identifier (displayed as hexadecimal value if unknown).

- for PID in the range 0 [0x00] to 31 [0x1F], and 8191 [0x1FFF] this is the ISO/DVB PID to PSI/SI table\_id mapping
- for others PID: last table\_id seen on this PID
- MPE without FEC will appear as MPE
- In case of correction, MPE and MPE-FEC will be aggregated as MPE+FEC

- **TPs**: Transport Packets.

Number of Transport Packets received with this PID

- **PUSI**: Payload Unit Start Indicator

number of Transport Packets with payload\_unit\_start\_indicator bit set received with this PID

- **TSC**: Transport Scrambling Control

number of Transport Packets with adaptation\_field\_control bit set received with this PID

- **AFC**: Adaptation Field Control

Number of Transport Packets with adaptation\_field\_control bit set received with this PID.

- **TPRI**: Transport Priority

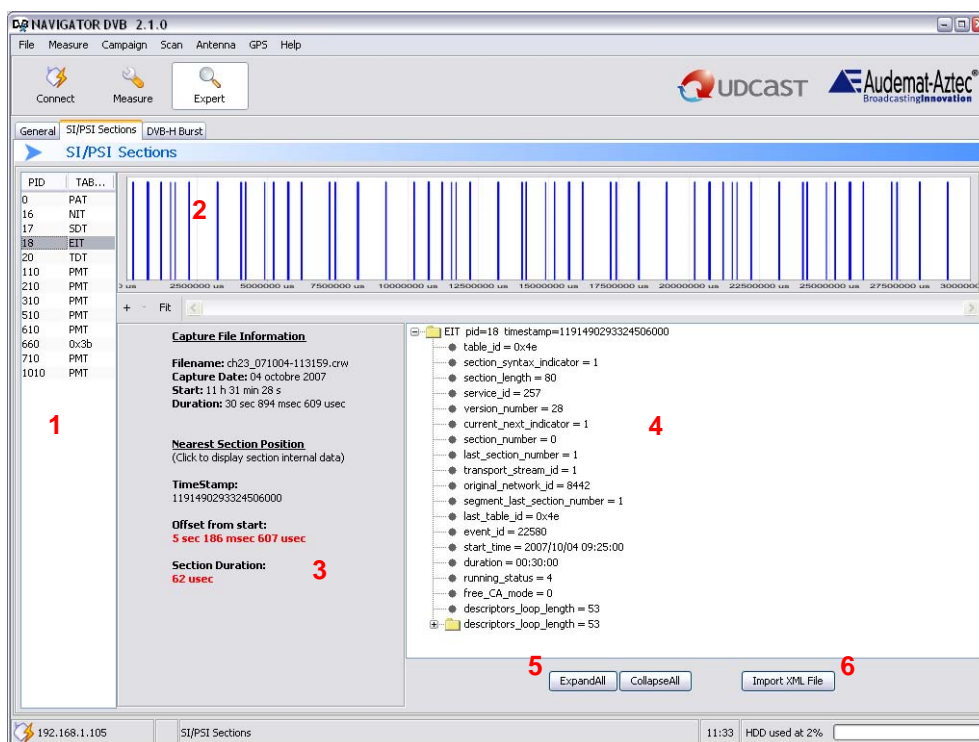
Number of Transport Packets with transport\_priority set received with this PID

- **TEI**: Transport Error Indicator

Number of Transport Packets with transport\_error\_indicator bit set received with this PID

- **CC: Continuity Counter**  
Number of Transport Packets lost based on the continuity\_counter discontinuities observed on this PID (might be inaccurate if there is a discontinuity greater than 16)
- **Definitions reminder (8)**

## 6.9.2. "SI/PSI" TAB



- **PID list (1)**

PID: Packet Identifier (displayed in decimal)

PID of all PSI/SI sections (except MPE and MPE-FEC)

TABLEID: Table Identifier (displayed as hexadecimal value if unknown)

Scattered per PID (several different PID may appear for a single TABLEID)

If one PID line is selected all sections belonging to this PID will be displayed on the time line. Each section will be displayed as a vertical box. The box width is the section duration (first bit to last bit).

Each section is displayed as a rectangle.

This rectangle's width depends on the duration of the section (from the 1st to the last received bit).

If the section is transmitted in several packets, it can cover a time period vastly superior to that of a transport packet.

- **Time line (2)**

Displays each section associated with a PID.

The time line unit is microseconds and start with 0 (start of capture)

- +/-/Fit might be used to zoom, unzoom, and fit into window
- local zooming might be performed with the mouse right button.
- click around a specific section to display section internal structure.

- **Capture file information (3)**

When moving the cursor in the time line display section, the fields: TimeStamp, Offset from start, Section Duration are displayed according to the nearest section (no need to click).

- TimeStamp: Time Stamp of the current section start in nanoseconds since 1970/01/01
- Offset from start: Time stamp of the current section in microseconds since the capture start
- Section Duration: First bit to last bit section duration, in microseconds.

- **Section internal structure (4)**

Display a hierarchical view of the various fields of the currently selection.

- **“ExpandAll” and “CollapseAll” (5)**

To hide or unhide details of the internal structure.

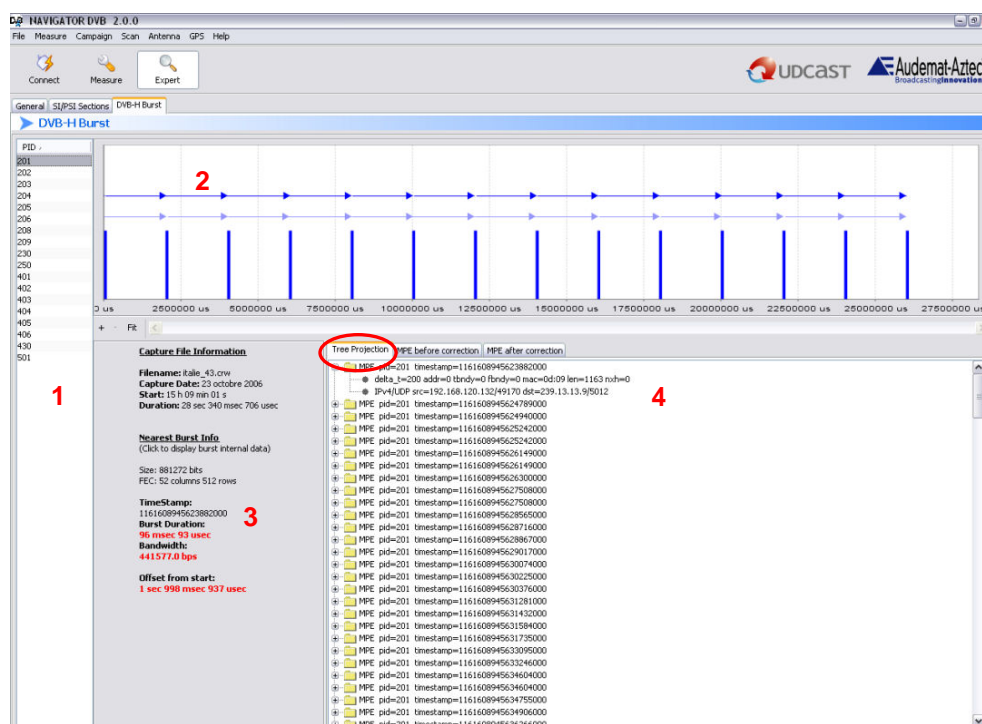
- **“Import XML File” button (5)**

To retrieve information on the PC in XML format. Simply choose a name and a location for the file:

```
<?xml version="1.0" encoding="ISO-8859-1" standalone="yes" ?>
<root>
- <section name="EIT" pid="18" timestamp="1191490293324506000">
  <node label="table_id" value="0x4e" />
  <node label="section_syntax_indicator" value="1" />
  <node label="section_length" value="80" />
  <node label="service_id" value="257" />
  <node label="version_number" value="28" />
  <node label="current_next_indicator" value="1" />
  <node label="section_number" value="0" />
  <node label="last_section_number" value="1" />
  <node label="transport_stream_id" value="1" />
  <node label="original_network_id" value="8442" />
  <node label="segment_last_section_number" value="1" />
  <node label="last_table_id" value="0x4e" />
  <node label="event_id" value="22580" />
  <node label="start_time" value="2007/10/04 09:25:00" />
  <node label="duration" value="00:30:00" />
  <node label="running_status" value="4" />
  <node label="free_CA_mode" value="0" />
  <node label="descriptors_loop_length" value="53" />
- <node type="descriptors_loop_length = 53">
- <node type="short_event_descriptor [0x4d]">
  <node label="descriptor_length" value="21" />
  <node type="descriptor_byte[]">0x66 0x72 0x65 0x0c 0x4c 0x65 0x73 0x20 0x5a 0x27 0x61 0x6d 0x6f 0x75 0x72 0x73 0x04 0x4a 0x65 0x75
  0x2e</node>
</node>
- <node type="component_descriptor [0x50]">
  <node label="descriptor_length" value="10" />
  <node type="descriptor_byte[]">0xf2 0x02 0x02 0x66 0x72 0x65 0x4d 0x6f 0x6e 0x6f</node>
</node>
- <node type="component_descriptor [0x50]">
  <node label="descriptor_length" value="6" />
  <node type="descriptor_byte[]">0xf1 0x01 0x01 0x66 0x72 0x65</node>
</node>
- <node type="parental_rating_descriptor [0x55]">
  <node label="descriptor_length" value="4" />
  <node type="descriptor_byte[]">0x66 0x72 0x61 0x00</node>
</node>
- <node type="content_descriptor [0x54]">
  <node label="descriptor_length" value="2" />
  <node type="descriptor_byte[]">0x31 0x00</node>
</node>
</section>
</root>
```

### 6.9.3. "DVB-H Burst" tab

#### 6.9.3.1 "Tree protection" tab



Displays each MPE and MPE-FEC burst related to the selected PID in section (1).

L The time line unit is microseconds and start with 0 (start of capture) (2).

Each burst shows with an arrow the delta\_t (min and max) to the next burst.

- +/-Fit might be used to zoom, unzoom, and fit into window
- local zooming might be performed with the mouse right button.
- click around a specific section to display section internal structure.

- **Capture File Information (3)**

When moving the cursor in the time line display section, the fields: TimeStamp, Size, FEC info, Offset from start, Section Duration are displayed according to the nearest section (no need to click).

- **Burst size:** total number of bits contained in the current burst the bits are counted from MPE and MPE-FEC
- **FEC:** number of columns and rows of FEC in the current burst
- **TimeStamp:** Time Stamp of the current burst start in nanoseconds since 1970/01/01
- **Burst Duration:** first bit to last bit burst duration, in microseconds
- **Bandwidth:** Burst bandwidth computed as (Burst Size / time distance to next burst)
- **Offset from start:** Time stamp of the current section in microseconds since the capture start

- **Burst internal structure**

Display a hierarchical view of the MPE and MPE-FEC sections belonging to the currently selected burst.

### 6.9.3.2 “MPE before correction” and “MPE after correction” tabs



<span style="color: yellow;">■</span> <b>Padded/Punctured Data</b>
50 680
38,817 %
<span style="color: black;">■</span> <b>Missing Blocks (orphan)</b>
0
0 %
<span style="color: magenta;">■</span> <b>Reconstructed data/fec</b>
0
0 %
<span style="color: blue;">■</span> <b>Header</b>
174
0,133 %
<span style="color: cyan;">■</span> <b>Computed Header</b>
0
0 %
<span style="color: green;">■</span> <b>Raw Data</b>
79 706
61,049 %
<span style="color: red;">■</span> <b>Missing Blocks</b>
0
0 %

#### Definitions:

##### **Padded/Punctured Data:**

Empty data blocks to maintain a constant flow.

##### **Missing blocks (orphan):**

The reconstruction of corrupted or missing blocks does not enable to save the full packet, it is also considered as lost and will be ignored by the receptor

##### **Reconstructed data/fec:**

Corrupted or missing data reconstructed by the fec.

##### **Header :**

Header of the IP packet.

##### **Computed Header:**

In spite of corrupted or non reconstructed missing data, it is possible for the FEC to recalculate a header from information already collected in the data flow and it is also possible to produce a valid packet.

##### **Raw data:**

Raw data.

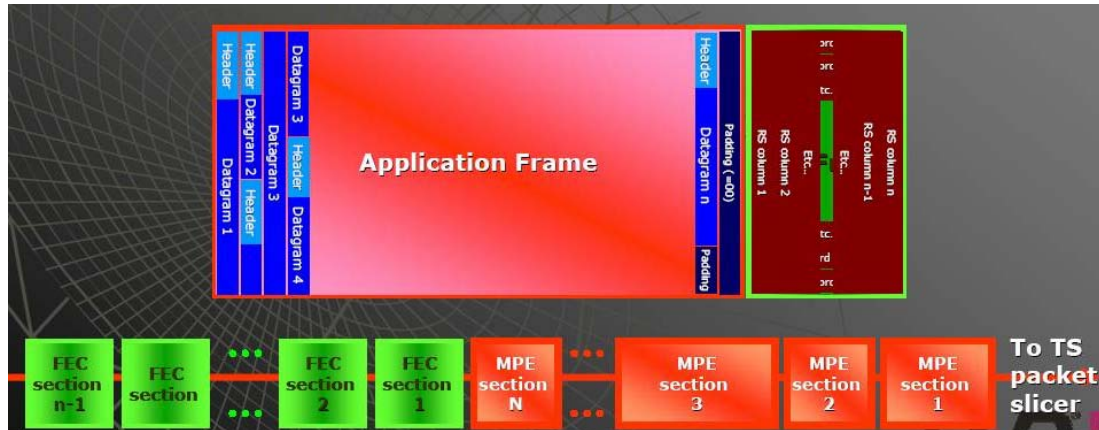
##### **Missing Blocks :**

Missing or corrupted data blocks before correction.

The MPE-FEC sections are organized in the form of a matrix where the data is presented in columns whose number and height are defined.

The FEC section contains data which enable corrections at each line.

These screens enable to display a graphic representation of the MPE present in the burst before and after correction.



## 7. FOR FURTHER INFORMATION

---

### **Audemat-Aztec**

20, avenue Neil Armstrong - Parc d'Activités J.F. Kennedy  
33700 BORDEAUX - MERIGNAC  
FRANCE

Tel: +33 (5)57 928 928 | Fax: +33 (5)57 928 929

Hotline: [services@audemat.com](mailto:services@audemat.com)

### **USA :**

### **Audemat-Aztec Inc**

1021 Ives Dairy Road - Suite 117  
Miami FL 33179  
USA

Tel: +1 (305)249 31 10 | Fax: +1 (305) 249 31 13

Hotline: [ussupport@audemat.com](mailto:ussupport@audemat.com)



---

## 8. GLOSSARY

---

ADSL - Asymmetric Digital Subscriber Line

AGC - Automatic Gain Control

ASI - Asynchronous Serial Interface

ATSC - Advanced Television Standard Committee

ATSC - Australian Telecommunication Standardization Committee

BER - Bit Error Rate

BIT: Contraction for 'binary digit' – the smallest information in the binary system.

BNC - Bayonet Neil-Concelman

C/N - Carrier to Noise ratio

CA - Conditional Access

CHAP - Challenge-Handshake Authentication Protocol

COFDM - Coded Orthogonal Frequency Division Multiplex

CRC - Cyclic Redundancy Check

DNS - Domain Name Server

DVB - Digital Video Broadcasting

DVB-T – terrestrial DVB

EBU - European Broadcasting Union

EPG - Electronic Program Guide

ES - Elementary Stream

ETSI - European Telecommunications Standards Institute

FEC - Forward Error Correction

FTP – File Transfer Protocol

GPRS - General Packet Radio Service

GSM - Global System for Mobile communications

HDTV - High Definition Television

HTML - Hyper Text Mark-up Language

HTTP - Hyper Text Transfer Protocol

IP - Internet Protocol

IQ - In-phase and Quadrature Components

ISDN - Integrated Services Digital Network

JAVA: Java is a platform-independent high-level programming language from Sun Microsystems

JPEG - Joint Photographics Experts Group

LAN - Local Area Network.

MER - Modulation Error Ratio

MFN - Multi-Frequency Network

MPEG - Motion Pictures Experts Group

OFDM - Orthogonal Frequency Division Multiplexing



PAP - Password Authentication Protocol  
PER - Packet Error Ratio  
PES - Packetized Elementary Stream (sometimes called Program Elementary Stream)  
PID - Packet Identifier  
POP3 - Post Office Protocol 3  
PPP - Point-to-Point Protocol  
PS - Program Stream  
PSK - Phase Shift Keying  
QAM - Quadrature Amplitude Modulation  
QPSK - Quaternary Phase Shift Keying  
RF - Radio Frequency  
RS - Reed Solomon  
SFN - Single Frequency Network  
SMTP - Simple Mail Transfer Protocol  
SNMP - System Networking Management Protocol  
SNR - Signal to Noise Ratio  
TCP - Transmission Control Protocol  
TCP/IP - Transmission Control Protocol / Internet Protocol  
TPS - Transport Packet Stream  
TS - Transport Stream  
TV – Television  
UDP - User Datagram Protocol  
UHF - Ultra High Frequency: from 300 MHz to 3 000 MHz  
URL - Uniform Resource Locator  
VHF - Very High Frequency: from 30 MHz to 300 MHz

## ANNEXE A: PARAMETERS RANGE

---

RF parameters		Range
Cell Id	Cell Id	0x0000 – 0xFFFF
DVB-T parameters	COFDM mode	2k / 4k(DVB-H) / 8k
	Guard interval	1/4 / 1/8 / 1/16 / 1/32
	Constellation	QPSK / 16QAM / 64QAM
	Code rate	1/2 / 2/3 / 3/4 / 5/6 / 7/8
RF		20 – 90 dBμV
C/N	C/N low_1 absolute threshold	15 – 30 dB
	C/N low_2 absolute threshold	15 – 30 dB
MER	MER absolute threshold	20 – 30 dB
BER	Bit Error Rate	1 - 999 *10-8
PER	PER absolute threshold	1 – 100%

## ANNEXE B: FUNCTION CHART

RF Functions	RF FULL Module
RF level	x
BER	x
MER	x
PER	x
Carrier/Noise	x
Transmission parameters	x
DVB-T presence (AGC, TPS...)	x
TS sync lost + sync byte error	x
Constellation	x
Impulse response (SFN)	x

Functions	MPEG-T basic Module	MPEG-T FULL Module (option)
TS Sync Loss	x	x
Sync byte error	x	x
PAT error	x	x
PMT error	x	x
Continuity count error		x
PMT error		x
PID error		x
Transport error	x	x
CRC error	x	x
PCR Error	x	x
PCR continuity error	x	x
PCR accuracy error		x
PTS error		x
CAT error	x	x
NIT Actual error	x	x
SI repetition error		x
SDT other error		x
EIT other error		x
EIT PF error		x
RST error		x
TDT error		x
PID and PMT bit rate		x
PCR Jitter		x
MIP timing error		x
MIP structure error		x
MIP presence error		x
MIP pointer error		x
MIP periodicity error		x
MIP TS rate error		x

Functions	MPEG-T basic Module	MPEG-T FULL Module (option)
MPEG services		x

Functions	DVB-H Expert Module (option)
PID Table	PID, table ID, TP, PUSI, TSC, AFC, TPRI, TEI, CC
SI/PSI Table	Time stamp, offset, duration, internal structure
DVB-H Burst	PID list, Time line, MPE-FEC
DVB-H Error	Burst_too_early, burst_too_late, table_boundary_missing, frame_boundary_missing, table_boundary_overflow, frame_boundary_overflow, address_error, max_burst_duration_overflow, padding_column_error